APPENDIX A

WASHINGTON STATE PREVAILING WAGE RATES FOR PUBLIC WORKS CONTRACTS

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State of Washington
Department of Labor & Industries
Prevailing Wage Section - Telephone 360-902-5335
PO Box 44540, Olympia, WA 98504-4540

Washington State Prevailing Wage

The PREVAILING WAGES listed here include both the hourly wage rate and the hourly rate of fringe benefits. On public works projects, worker's wage and benefit rates must add to not less than this total. A brief description of overtime calculation requirements are provided on the Benefit Code Key.

Journey Level Prevailing Wage Rates for the Effective Date: 1/6/2023

County	Trade	Job Classification	Wage	Holiday	Overtime	Note	*Risk Class
Kitsap	Asbestos Abatement Workers	Journey Level	$56.80	5D	1H		View
Kitsap	Boilermakers	Journey Level	$72.54	5N	1C		View
Kitsap	Brick Mason	Journey Level	$66.32	7E	1N		View
Kitsap	Brick Mason	Pointer-Caulker-Cleaner	$66.32	7E	1N		View
Kitsap	Building Service Employees	Janitor	$15.74		1		View
Kitsap	Building Service Employees	Shampooer	$15.74		1		View
Kitsap	Building Service Employees	Waxer	$15.74		1		View
Kitsap	Building Service Employees	Window Cleaner	$15.74		1		View
Kitsap	Cabinet Makers (In Shop)	Journey Level	$23.72		1		View
Kitsap	Carpenters	Acoustical Worker	$71.53	15J	4C		View
Kitsap	Carpenters	Bridge, Dock And Wharf Carpenters	$71.53	15J	4C		View
Kitsap	Carpenters	Floor Layer & Floor Finisher	$71.53	15J	4C		View
Kitsap	Carpenters	Journey Level	$71.53	15J	4C		View
Kitsap	Carpenters	Scaffold Erector	$71.53	15J	4C		View
Kitsap	Cement Masons	Application of all Composition Mastic	$70.09	15J	4U		View
Kitsap	Cement Masons	Application of all Epoxy Material	$69.59	15J	4U		View
Kitsap	Cement Masons	Application of all Plastic Material	$70.09	15J	4U		View
Kitsap	Cement Masons	Application of Sealing Compound	$69.59	15J	4U		View
Kitsap	Cement Masons	Application of Underlayment	$70.09	15J	4U		View
Kitsap	Cement Masons	Building General	$69.59	15J	4U		View
Kitsap	Cement Masons	Composition or Kalman Floors	$70.09	15J	4U		View
Kitsap	Cement Masons	Concrete Paving	$69.59	15J	4U		View
Kitsap	Cement Masons	Curb & Gutter Machine	$70.09	15J	4U		View
Kitsap	Cement Masons	Curb & Gutter, Sidewalks	$69.59	15J	4U		View
Kitsap	Cement Masons	Curing Concrete	$69.59	15J	4U		View
Kitsap	Cement Masons	Finish Colored Concrete	$70.09	15J	4U		View

Kitsap	Cement Masons	Floor Grinding	$70.09	15J	4U		View
Kitsap	Cement Masons	Floor Grinding/Polisher	$69.59	15J	4U		View
Kitsap	Cement Masons	Green Concrete Saw, self-powered	$70.09	15J	4U		View
Kitsap	Cement Masons	Grouting of all Plates	$69.59	15J	4U		View
Kitsap	Cement Masons	Grouting of all Tilt-up Panels	$69.59	15J	4U		View
Kitsap	Cement Masons	Gunite Nozzleman	$70.09	15J	4U		View
Kitsap	Cement Masons	Hand Powered Grinder	$70.09	15J	4U		View
Kitsap	Cement Masons	Journey Level	$69.59	15J	4U		View
Kitsap	Cement Masons	Patching Concrete	$69.59	15J	4U		View
Kitsap	Cement Masons	Pneumatic Power Tools	$70.09	15J	4U		View
Kitsap	Cement Masons	Power Chipping & Brushing	$70.09	15J	4U		View
Kitsap	Cement Masons	Sand Blasting Architectural Finish	$70.09	15J	4U		View
Kitsap	Cement Masons	Screed & Rodding Machine	$70.09	15J	4U		View
Kitsap	Cement Masons	Spackling or Skim Coat Concrete	$69.59	15J	4U		View
Kitsap	Cement Masons	Troweling Machine Operator	$70.09	15J	4U		View
Kitsap	Cement Masons	Troweling Machine Operator on Colored Slabs	$70.09	15J	4U		View
Kitsap	Cement Masons	Tunnel Workers	$70.09	15J	4U		View
Kitsap	Divers & Tenders	Bell/Vehicle or Submersible Operator (Not Under Pressure)	$126.05	15J	4C		View
Kitsap	Divers & Tenders	Dive Supervisor/Master	$89.94	15J	4C		View
Kitsap	Divers & Tenders	Diver	$126.05	15J	4C	8V	View
Kitsap	Divers & Tenders	Diver On Standby	$84.94	15J	4C		View
Kitsap	Divers & Tenders	Diver Tender	$77.16	15J	4C		View
Kitsap	Divers & Tenders	Hyperbaric Worker - Compressed Air Worker 0-30.00 PSI	$89.09	15J	4C		View
Kitsap	Divers & Tenders	Hyperbaric Worker - Compressed Air Worker 30.01 - 44.00 PSI	$94.09	15J	4C		View
Kitsap	Divers & Tenders	Hyperbaric Worker - Compressed Air Worker 44.01 - 54.00 PSI	$107.09	15J	4C		View
Kitsap	Divers & Tenders	Hyperbaric Worker - Compressed Air Worker 54.01 - 60.00 PSI	$103.09	15J	4C		View
Kitsap	Divers & Tenders	Hyperbaric Worker - Compressed Air Worker 60.01 - 64.00 PSI	$105.59	15J	4C		View
Kitsap	Divers & Tenders	Hyperbaric Worker - Compressed Air Worker 64.01 - 68.00 PSI	$110.59	15J	4C		View
Kitsap	Divers & Tenders	Hyperbaric Worker - Compressed Air Worker 68.01 - 70.00 PSI	$112.59	15J	4C		View
Kitsap	Divers & Tenders	Hyperbaric Worker - Compressed Air Worker 70.01 - 72.00 PSI	$114.59	15J	4C		View

Kitsap	Divers & Tenders	Hyperbaric Worker - Compressed Air Worker 72.01 - 74.00 PSI	$116.59	15J	4C		View
Kitsap	Divers & Tenders	Manifold Operator	$77.16	15J	4C		View
Kitsap	Divers & Tenders	Manifold Operator Mixed Gas	$82.16	15J	4C		View
Kitsap	Divers & Tenders	Remote Operated Vehicle Operator/Technician	$77.16	15J	4C		View
Kitsap	Divers & Tenders	Remote Operated Vehicle Tender	$71.98	15J	4C		View
Kitsap	Dredge Workers	Assistant Engineer	$76.56	5D	3F		View
Kitsap	Dredge Workers	Assistant Mate (Deckhand)	$75.97	5D	3F		View
Kitsap	Dredge Workers	Boatmen	$76.56	5D	3F		View
Kitsap	Dredge Workers	Engineer Welder	$78.03	5D	3F		View
Kitsap	Dredge Workers	Leverman, Hydraulic	$79.59	5D	3F		View
Kitsap	Dredge Workers	Mates	$76.56	5D	3F		View
Kitsap	Dredge Workers	Oiler	$75.97	5D	3F		View
Kitsap	Drywall Applicator	Journey Level	$71.53	15J	4C		View
Kitsap	Drywall Tapers	Journey Level	$70.61	5P	1E		View
Kitsap	Electrical Fixture Maintenance Workers	Journey Level	$35.19	5L	1E		View
Kitsap	Electricians - Inside	Cable Splicer	$99.36	7C	4E		View
Kitsap	Electricians - Inside	Cable Splicer (tunnel)	$106.81	7C	4E		View
Kitsap	Electricians - Inside	Certified Welder	$95.98	7C	4E		View
Kitsap	Electricians - Inside	Certified Welder (tunnel)	$103.09	7C	4E		View
Kitsap	Electricians - Inside	Construction Stock Person	$47.03	7C	4E		View
Kitsap	Electricians - Inside	Journey Level	$92.59	7C	4E		View
Kitsap	Electricians - Inside	Journey Level (tunnel)	$99.36	7C	4E		View
Kitsap	Electricians - Motor Shop	Craftsman	$15.74		1		View
Kitsap	Electricians - Motor Shop	Journey Level	$15.74		1		View
Kitsap	Electricians - Powerline Construction	Cable Splicer	$88.89	5A	4D		View
Kitsap	Electricians - Powerline Construction	Certified Line Welder	$81.65	5A	4D		View
Kitsap	Electricians - Powerline Construction	Groundperson	$52.91	5A	4D		View
Kitsap	Electricians - Powerline Construction	Heavy Line Equipment Operator	$81.65	5A	4D		View
Kitsap	Electricians - Powerline Construction	Journey Level Lineperson	$81.65	5A	4D		View
Kitsap	Electricians - Powerline Construction	Line Equipment Operator	$70.02	5A	4D		View
Kitsap	Electricians - Powerline Construction	Meter Installer	$52.91	5A	4D	8W	View
Kitsap	Electricians - Powerline Construction	Pole Sprayer	$81.65	5A	4D		View
Kitsap	Electricians - Powerline Construction	Powderperson	$60.75	5A	4D		View
Kitsap	Electronic Technicians	Journey Level	$60.10	7E	1E		View
Kitsap	Elevator Constructors	Mechanic	$103.81	7D	4A		View
Kitsap	Elevator Constructors	Mechanic In Charge	$112.09	7D	4A		View

Kitsap	Fabricated Precast Concrete Products	Journey Level	$15.74		1		View
Kitsap	Fabricated Precast Concrete Products	Journey Level - In-Factory Work Only	$15.74		1		View
Kitsap	Fence Erectors	Fence Erector	$48.14	15J	4V	8Y	View
Kitsap	Fence Erectors	Fence Laborer	$48.14	15J	4V	8Y	View
Kitsap	Flaggers	Journey Level	$48.14	15J	4V	8Y	View
Kitsap	Glaziers	Journey Level	$75.91	7L	1Y		View
Kitsap	Heat & Frost Insulators And Asbestos Workers	Journey Level	$84.58	15H	11C		View
Kitsap	Heating Equipment Mechanics	Journey Level	$94.11	7F	1E		View
Kitsap	Hod Carriers & Mason Tenders	Journey Level	$59.85	15J	4V	8Y	View
Kitsap	Industrial Power Vacuum Cleaner	Journey Level	$29.89		1		View
Kitsap	Inland Boatmen	Boat Operator	$61.41	5B	1K		View
Kitsap	Inland Boatmen	Cook	$56.48	5B	1K		View
Kitsap	Inland Boatmen	Deckhand	$57.48	5B	1K		View
Kitsap	Inland Boatmen	Deckhand Engineer	$58.81	5B	1K		View
Kitsap	Inland Boatmen	Launch Operator	$58.89	5B	1K		View
Kitsap	Inland Boatmen	Mate	$57.31	5B	1K		View
Kitsap	Inspection/Cleaning/Sealing Of Sewer & Water Systems By Remote Control	Cleaner Operator, Foamer Operator	$15.74		1		View
Kitsap	Inspection/Cleaning/Sealing Of Sewer & Water Systems By Remote Control	Grout Truck Operator	$15.74		1		View
Kitsap	Inspection/Cleaning/Sealing Of Sewer & Water Systems By Remote Control	Head Operator	$15.74		1		View
Kitsap	Inspection/Cleaning/Sealing Of Sewer & Water Systems By Remote Control	Tv Truck Operator	$24.17		1		View
Kitsap	Insulation Applicators	Journey Level	$71.53	15J	4C		View
Kitsap	Ironworkers	Journeyman	$82.03	7N	1O		View
Kitsap	Laborers	Air, Gas Or Electric Vibrating Screed	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Airtrac Drill Operator	$58.56	15J	4V	8Y	View
Kitsap	Laborers	Ballast Regular Machine	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Batch Weighman	$48.14	15J	4V	8Y	View
Kitsap	Laborers	Brick Pavers	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Brush Cutter	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Brush Hog Feeder	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Burner	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Caisson Worker	$58.56	15J	4V	8Y	View
Kitsap	Laborers	Carpenter Tender	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Cement Dumper-paving	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Cement Finisher Tender	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Change House Or Dry Shack	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Chipping Gun (30 Lbs. And Over)	$57.84	15J	4V	8Y	View

Kitsap	Laborers	Chipping Gun (Under 30 Lbs.)	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Choker Setter	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Chuck Tender	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Clary Power Spreader	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Clean-up Laborer	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Concrete Dumper/Chute Operator	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Concrete Form Stripper	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Concrete Placement Crew	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Concrete Saw Operator/Core Driller	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Crusher Feeder	$48.14	15J	4V	8Y	View
Kitsap	Laborers	Curing Laborer	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Demolition: Wrecking & Moving (Incl. Charred Material)	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Ditch Digger	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Diver	$58.56	15J	4V	8Y	View
Kitsap	Laborers	Drill Operator (Hydraulic, Diamond)	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Dry Stack Walls	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Dump Person	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Epoxy Technician	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Erosion Control Worker	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Faller & Bucker Chain Saw	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Fine Graders	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Firewatch	$48.14	15J	4V	8Y	View
Kitsap	Laborers	Form Setter	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Gabian Basket Builders	$56.80	15J	4V	8Y	View
Kitsap	Laborers	General Laborer	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Grade Checker & Transit Person	$59.85	15J	4V	8Y	View
Kitsap	Laborers	Grinders	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Grout Machine Tender	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Groutmen (Pressure) Including Post Tension Beams	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Guardrail Erector	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Hazardous Waste Worker (Level A)	$58.56	15J	4V	8Y	View
Kitsap	Laborers	Hazardous Waste Worker (Level B)	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Hazardous Waste Worker (Level C)	$56.80	15J	4V	8Y	View
Kitsap	Laborers	High Scaler	$58.56	15J	4V	8Y	View
Kitsap	Laborers	Jackhammer	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Laserbeam Operator	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Maintenance Person	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Manhole Builder-Mudman	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Material Yard Person	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Mold Abatement Worker	$56.80	15J	4V	8Y	View

Kitsap	Laborers	Motorman-Dinky Locomotive	$59.95	15J	4V	8Y	View
Kitsap	Laborers	nozzleman (concrete pump, green cutter when using combination of high pressure air & water on concrete & rock, sandblast, gunite, shotcrete, water blaster, vacuum blaster)	$59.85	15J	4V	8Y	View
Kitsap	Laborers	Pavement Breaker	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Pilot Car	$48.14	15J	4V	8Y	View
Kitsap	Laborers	Pipe Layer (Lead)	$59.85	15J	4V	8Y	View
Kitsap	Laborers	Pipe Layer/Tailor	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Pipe Pot Tender	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Pipe Reliner	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Pipe Wrapper	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Pot Tender	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Powderman	$58.56	15J	4V	8Y	View
Kitsap	Laborers	Powderman's Helper	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Power Jacks	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Railroad Spike Puller - Power	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Raker - Asphalt	$59.85	15J	4V	8Y	View
Kitsap	Laborers	Re-timberman	$58.56	15J	4V	8Y	View
Kitsap	Laborers	Remote Equipment Operator	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Rigger/Signal Person	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Rip Rap Person	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Rivet Buster	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Rodder	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Scaffold Erector	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Scale Person	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Sloper (Over 20")	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Sloper Sprayer	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Spreader (Concrete)	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Stake Hopper	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Stock Piler	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Swinging Stage/Boatswain Chair	$48.14	15J	4V	8Y	View
Kitsap	Laborers	Tamper & Similar Electric, Air & Gas Operated Tools	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Tamper (Multiple & Self-propelled)	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Timber Person - Sewer (Lagger, Shorer & Cribber)	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Toolroom Person (at Jobsite)	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Topper	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Track Laborer	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Track Liner (Power)	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Traffic Control Laborer	$51.48	15J	4V	9C	View
Kitsap	Laborers	Traffic Control Supervisor	$54.55	15J	4V	9C	View
Kitsap	Laborers	Truck Spotter	$56.80	15J	4V	8Y	View

Kitsap	Laborers	Tugger Operator	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Tunnel Work-Compressed Air Worker 0-30 psi	$158.87	15J	4V	9B	View
Kitsap	Laborers	Tunnel Work-Compressed Air Worker 30.01-44.00 psi	$163.90	15J	4V	9B	View
Kitsap	Laborers	Tunnel Work-Compressed Air Worker 44.01-54.00 psi	$167.58	15J	4V	9B	View
Kitsap	Laborers	Tunnel Work-Compressed Air Worker 54.01-60.00 psi	$173.28	15J	4V	9B	View
Kitsap	Laborers	Tunnel Work-Compressed Air Worker 60.01-64.00 psi	$175.40	15J	4V	9B	View
Kitsap	Laborers	Tunnel Work-Compressed Air Worker 64.01-68.00 psi	$180.50	15J	4V	9B	View
Kitsap	Laborers	Tunnel Work-Compressed Air Worker 68.01-70.00 psi	$182.40	15J	4V	9B	View
Kitsap	Laborers	Tunnel Work-Compressed Air Worker 70.01-72.00 psi	$184.40	15J	4V	9B	View
Kitsap	Laborers	Tunnel Work-Compressed Air Worker 72.01-74.00 psi	$186.40	15J	4V	9B	View
Kitsap	Laborers	Tunnel Work-Guage and Lock Tender	$59.95	15J	4V	8Y	View
Kitsap	Laborers	Tunnel Work-Miner	$59.95	15J	4V	8Y	View
Kitsap	Laborers	Vibrator	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Vinyl Seamer	$56.80	15J	4V	8Y	View
Kitsap	Laborers	Watchman	$43.76	15J	4V	8Y	View
Kitsap	Laborers	Welder	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Well Point Laborer	$57.84	15J	4V	8Y	View
Kitsap	Laborers	Window Washer/Cleaner	$43.76	15J	4V	8Y	View
Kitsap	Laborers - Underground Sewer & Water	General Laborer & Topman	$56.80	15J	4V	8Y	View
Kitsap	Laborers - Underground Sewer & Water	Pipe Layer	$57.84	15J	4V	8Y	View
Kitsap	Landscape Construction	Landscape Construction/Landscaping Or Planting Laborers	$43.76	15J	4V	8Y	View
Kitsap	Landscape Construction	Landscape Operator	$75.51	15J	11G	8X	View
Kitsap	Landscape Maintenance	Groundskeeper	$15.74		1		View
Kitsap	Lathers	Journey Level	$71.53	15J	4C		View
Kitsap	Marble Setters	Journey Level	$66.32	7E	1N		View
Kitsap	Metal Fabrication (In Shop)	Fitter	$26.96		1		View
Kitsap	Metal Fabrication (In Shop)	Laborer	$15.74		1		View
Kitsap	Metal Fabrication (In Shop)	Machine Operator	$15.74		1		View
Kitsap	Metal Fabrication (In Shop)	Welder	$15.74		1		View
Kitsap	Millwright	Journey Level	$73.08	15J	4C		View
Kitsap	Modular Buildings	Cabinet Assembly	$15.74		1		View
Kitsap	Modular Buildings	Electrician	$15.74		1		View
Kitsap	Modular Buildings	Equipment Maintenance	$15.74		1		View
Kitsap	Modular Buildings	Plumber	$15.74		1		View
Kitsap	Modular Buildings	Production Worker	$15.74		1		View
Kitsap	Modular Buildings	Tool Maintenance	$15.74		1		View

Kitsap	Modular Buildings	Utility Person	$15.74		1		View
Kitsap	Modular Buildings	Welder	$15.74		1		View
Kitsap	Painters	Journey Level	$49.46	6Z	11J		View
Kitsap	Pile Driver	Crew Tender	$77.16	15J	4C		View
Kitsap	Pile Driver	Journey Level	$71.98	15J	4C		View
Kitsap	Plasterers	Journey Level	$67.49	7Q	1R		View
Kitsap	Plasterers	Nozzleman	$71.49	7Q	1R		View
Kitsap	Playground & Park Equipment Installers	Journey Level	$15.74		1		View
Kitsap	Plumbers & Pipefitters	Journey Level	$83.47	5A	1G		View
Kitsap	Power Equipment Operators	Asphalt Plant Operators	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators	Assistant Engineer	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators	Barrier Machine (zipper)	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators	Batch Plant Operator: concrete	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators	Boat Operator	$76.79	7A	11H	8X	View
Kitsap	Power Equipment Operators	Bobcat	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators	Brokk - Remote Demolition Equipment	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators	Brooms	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators	Bump Cutter	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators	Cableways	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators	Chipper	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators	Compressor	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators	Concrete Finish Machine - Laser Screed	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators	Concrete Pump - Mounted Or Trailer High Pressure Line Pump, Pump High Pressure	$75.51	15J	11G	8X	View
Kitsap	Power Equipment Operators	Concrete Pump: Truck Mount With Boom Attachment Over 42 M	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators	Concrete Pump: Truck Mount With Boom Attachment Up To 42m	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators	Conveyors	$75.51	15J	11G	8X	View
Kitsap	Power Equipment Operators	Cranes Friction: 200 tons and over	$79.13	7A	11H	8X	View
Kitsap	Power Equipment Operators	Cranes, A-frame: 10 tons and under	$72.22	7A	11H	8X	View
Kitsap	Power Equipment Operators	Cranes: 100 tons through 199 tons, or 150' of boom (including jib with attachments)	$77.56	7A	11H	8X	View
Kitsap	Power Equipment Operators	Cranes: 20 tons through 44 tons with attachments	$76.11	7A	11H	8X	View
Kitsap	Power Equipment Operators	Cranes: 200 tons- 299 tons, or 250' of boom including jib with attachments	$78.36	7A	11H	8X	View
Kitsap	Power Equipment Operators	Cranes: 300 tons and over or 300' of boom including jib with attachments	$79.13	7A	11H	8X	View

Kitsap	Power Equipment Operators	Cranes: 45 tons through 99 tons, under 150' of boom(including jib with attachments)	$76.79	7A	11H	8X	View
Kitsap	Power Equipment Operators	Cranes: Friction cranes through 199 tons	$78.36	7A	11H	8X	View
Kitsap	Power Equipment Operators	Cranes: through 19 tons with attachments, a-frame over 10 tons	$75.53	7A	11H	8X	View
Kitsap	Power Equipment Operators	Crusher	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators	Deck Engineer/Deck Winches (power)	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators	Derricks, On Building Work	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators	Dozers D-9 & Under	$75.51	15J	11G	8X	View
Kitsap	Power Equipment Operators	Drill Oilers: Auger Type, Truck Or Crane Mount	$75.51	15J	11G	8X	View
Kitsap	Power Equipment Operators	Drilling Machine	$77.54	15J	11G	8X	View
Kitsap	Power Equipment Operators	Elevator and man-lift: permanent and shaft type	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators	Finishing Machine, Bidwell And Gamaco & Similar Equipment	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators	Forklift: 3000 lbs and over with attachments	$75.51	15J	11G	8X	View
Kitsap	Power Equipment Operators	Forklifts: under 3000 lbs. with attachments	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators	Grade Engineer: Using Blue Prints, Cut Sheets, Etc	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators	Gradechecker/Stakeman	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators	Guardrail Punch	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators	Hard Tail End Dump Articulating Off- Road Equipment 45 Yards. & Over	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators	Hard Tail End Dump Articulating Off-road Equipment Under 45 Yards	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators	Horizontal/Directional Drill Locator	$75.51	15J	11G	8X	View
Kitsap	Power Equipment Operators	Horizontal/Directional Drill Operator	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators	Hydralifts/Boom Trucks Over 10 Tons	$75.53	7A	11H	8X	View
Kitsap	Power Equipment Operators	Hydralifts/boom trucks: 10 tons and under	$72.22	7A	11H	8X	View
Kitsap	Power Equipment Operators	Leverman	$78.33	15J	11G	8X	View
Kitsap	Power Equipment Operators	Loader, Overhead, 6 Yards. But Not Including 8 Yards	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators	Loaders, Overhead Under 6 Yards	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators	Loaders, Plant Feed	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators	Loaders: Elevating Type Belt	$75.51	15J	11G	8X	View
Kitsap	Power Equipment Operators	Locomotives, All	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators	Material Transfer Device	$76.09	15J	11G	8X	View

Kitsap	Power Equipment Operators	Mechanics: All (Leadmen - $0.50 per hour over mechanic)	$77.54	15J	11G	8X	View
Kitsap	Power Equipment Operators	Motor Patrol Graders	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators	Mucking Machine, Mole, Tunnel Drill, Boring, Road Header And/or Shield	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators	Oil Distributors, Blower Distribution & Mulch Seeding Operator	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators	Outside Hoists (Elevators and Manlifts), Air Tuggers, Strato	$75.51	15J	11G	8X	View
Kitsap	Power Equipment Operators	Overhead, bridge type Crane: 20 tons through 44 tons	$76.11	7A	11H	8X	View
Kitsap	Power Equipment Operators	Overhead, bridge type: 100 tons and over	$77.56	7A	11H	8X	View
Kitsap	Power Equipment Operators	Overhead, bridge type: 45 tons through 99 tons	$76.79	7A	11H	8X	View
Kitsap	Power Equipment Operators	Pavement Breaker	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators	Pile Driver (other Than Crane Mount)	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators	Plant Oiler - Asphalt, Crusher	$75.51	15J	11G	8X	View
Kitsap	Power Equipment Operators	Posthole Digger, Mechanical	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators	Power Plant	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators	Pumps - Water	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators	Quad 9, Hd 41, D10 And Over	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators	Quick Tower: no cab, under 100 feet in height base to boom	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators	Remote Control Operator On Rubber Tired Earth Moving Equipment	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators	Rigger and Bellman	$72.22	7A	11H	8X	View
Kitsap	Power Equipment Operators	Rigger/Signal Person, Bellman(Certified)	$75.53	7A	11H	8X	View
Kitsap	Power Equipment Operators	Rollagon	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators	Roller, Other Than Plant Mix	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators	Roller, Plant Mix Or Multi-lift Materials	$75.51	15J	11G	8X	View
Kitsap	Power Equipment Operators	Roto-mill, Roto-grinder	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators	Saws - Concrete	$75.51	15J	11G	8X	View
Kitsap	Power Equipment Operators	Scraper, Self Propelled Under 45 Yards	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators	Scrapers - Concrete & Carry All	$75.51	15J	11G	8X	View
Kitsap	Power Equipment Operators	Scrapers, Self-propelled: 45 Yards And Over	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators	Service Engineers: Equipment	$75.51	15J	11G	8X	View
Kitsap	Power Equipment Operators	Shotcrete/Gunite Equipment	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators	Shovel, Excavator, Backhoe, Tractors Under 15 Metric Tons	$75.51	15J	11G	8X	View
Kitsap	Power Equipment Operators	Shovel, Excavator, Backhoe: Over 30 Metric Tons To 50	$76.77	15J	11G	8X	View

		Metric Tons					
Kitsap	Power Equipment Operators	Shovel, Excavator, Backhoes, Tractors: 15 To 30 Metric Tons	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators	Shovel, Excavator, Backhoes: Over 50 Metric Tons To 90 Metric Tons	$77.54	15J	11G	8X	View
Kitsap	Power Equipment Operators	Shovel, Excavator, Backhoes: Over 90 Metric Tons	$78.33	15J	11G	8X	View
Kitsap	Power Equipment Operators	Slipform Pavers	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators	Spreader, Topsider & Screedman	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators	Subgrader Trimmer	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators	Tower Bucket Elevators	$75.51	15J	11G	8X	View
Kitsap	Power Equipment Operators	Tower Crane: over 175' through 250' in height, base to boom	$78.36	7A	11H	8X	View
Kitsap	Power Equipment Operators	Tower crane: up to 175' in height base to boom	$77.56	7A	11H	8X	View
Kitsap	Power Equipment Operators	Tower Cranes: over 250' in height from base to boom	$79.13	7A	11H	8X	View
Kitsap	Power Equipment Operators	Transporters, All Track Or Truck Type	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators	Trenching Machines	$75.51	15J	11G	8X	View
Kitsap	Power Equipment Operators	Truck Crane Oiler/Driver: 100 tons and over	$76.11	7A	11H	8X	View
Kitsap	Power Equipment Operators	Truck crane oiler/driver: under 100 tons	$75.53	7A	11H	8X	View
Kitsap	Power Equipment Operators	Truck Mount Portable Conveyor	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators	Vac Truck (Vactor Guzzler, Hydro Excavator)	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators	Welder	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators	Wheel Tractors, Farmall Type	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators	Yo Yo Pay Dozer	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Asphalt Plant Operators	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Assistant Engineer	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Barrier Machine (zipper)	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Batch Plant Operator, Concrete	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Boat Operator	$76.79	7A	11H	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Bobcat	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Brokk - Remote Demolition Equipment	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Brooms	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Bump Cutter	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Cableways	$76.77	15J	11G	8X	View

Kitsap	Power Equipment Operators-Underground Sewer & Water	Chipper	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Compressor	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Concrete Finish Machine - Laser Screed	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Concrete Pump - Mounted Or Trailer High Pressure Line Pump, Pump High Pressure	$75.51	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Concrete Pump: Truck Mount With Boom Attachment Over 42 M	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Concrete Pump: Truck Mount With Boom Attachment Up To 42m	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Conveyors	$75.51	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Cranes Friction: 200 tons and over	$79.13	7A	11H	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Cranes, A-frame: 10 tons and under	$72.22	7A	11H	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Cranes: 100 tons through 199 tons, or 150' of boom (including jib with attachments)	$77.56	7A	11H	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Cranes: 20 tons through 44 tons with attachments	$76.11	7A	11H	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Cranes: 20 tons through 44 tons with attachments	$76.11	7A	11H	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Cranes: 200 tons- 299 tons, or 250' of boom including jib with attachments	$78.36	7A	11H	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Cranes: 300 tons and over or 300' of boom including jib with attachments	$79.13	7A	11H	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Cranes: 45 tons through 99 tons, under 150' of boom(including jib with attachments)	$76.79	7A	11H	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Cranes: Friction cranes through 199 tons	$78.36	7A	11H	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Cranes: through 19 tons with attachments, a-frame over 10 tons	$75.53	7A	11H	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Crusher	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Deck Engineer/Deck Winches (power)	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Derricks, On Building Work	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Dozers D-9 & Under	$75.51	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Drill Oilers: Auger Type, Truck Or Crane Mount	$75.51	15J	11G	8X	View

Kitsap	Power Equipment Operators-Underground Sewer & Water	Drilling Machine	$77.54	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Elevator and man-lift: permanent and shaft type	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Finishing Machine, Bidwell And Gamaco & Similar Equipment	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Forklift: 3000 lbs and over with attachments	$75.51	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Forklifts: under 3000 lbs. with attachments	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Grade Engineer: Using Blue Prints, Cut Sheets, Etc	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Gradechecker/Stakeman	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Guardrail Punch	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Hard Tail End Dump Articulating Off- Road Equipment 45 Yards. & Over	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Hard Tail End Dump Articulating Off-road Equipment Under 45 Yards	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Horizontal/Directional Drill Locator	$75.51	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Horizontal/Directional Drill Operator	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Hydralifts/boom trucks: 10 tons and under	$72.22	7A	11H	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Hydralifts/boom trucks: over 10 tons	$75.53	7A	11H	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Leverman	$78.33	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Loader, Overhead, 6 Yards. But Not Including 8 Yards	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Loaders, Overhead Under 6 Yards	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Loaders, Plant Feed	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Loaders: Elevating Type Belt	$75.51	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Locomotives, All	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Material Transfer Device	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Mechanics: All (Leadmen - $0.50 per hour over mechanic)	$77.54	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Motor Patrol Graders	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Mucking Machine, Mole, Tunnel Drill, Boring, Road Header And/or Shield	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Oil Distributors, Blower Distribution & Mulch Seeding	$72.20	15J	11G	8X	View

		Operator					
Kitsap	Power Equipment Operators-Underground Sewer & Water	Outside Hoists (Elevators and Manlifts), Air Tuggers, Strato	$75.51	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Overhead, bridge type Crane: 20 tons through 44 tons	$76.11	7A	11H	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Overhead, bridge type: 100 tons and over	$77.56	7A	11H	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Overhead, bridge type: 45 tons through 99 tons	$76.79	7A	11H	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Pavement Breaker	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Pile Driver (other Than Crane Mount)	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Plant Oiler - Asphalt, Crusher	$75.51	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Posthole Digger, Mechanical	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Power Plant	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Pumps - Water	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Quad 9, Hd 41, D10 And Over	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Quick Tower: no cab, under 100 feet in height base to boom	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Remote Control Operator On Rubber Tired Earth Moving Equipment	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Rigger and Bellman	$72.22	7A	11H	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Rigger/Signal Person, Bellman(Certified)	$75.53	7A	11H	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Rollagon	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Roller, Other Than Plant Mix	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Roller, Plant Mix Or Multi-lift Materials	$75.51	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Roto-mill, Roto-grinder	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Saws - Concrete	$75.51	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Scraper, Self Propelled Under 45 Yards	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Scrapers - Concrete & Carry All	$75.51	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Scrapers, Self-propelled: 45 Yards And Over	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Shotcrete/Gunite Equipment	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Shovel, Excavator, Backhoe, Tractors Under 15 Metric Tons	$75.51	15J	11G	8X	View

Kitsap	Power Equipment Operators-Underground Sewer & Water	Shovel, Excavator, Backhoe: Over 30 Metric Tons To 50 Metric Tons	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Shovel, Excavator, Backhoes, Tractors: 15 To 30 Metric Tons	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Shovel, Excavator, Backhoes: Over 50 Metric Tons To 90 Metric Tons	$77.54	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Shovel, Excavator, Backhoes: Over 90 Metric Tons	$78.33	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Slipform Pavers	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Spreader, Topsider & Screedman	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Subgrader Trimmer	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Tower Bucket Elevators	$75.51	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Tower Crane: over 175' through 250' in height, base to boom	$78.36	7A	11H	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Tower crane: up to 175' in height base to boom	$77.56	7A	11H	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Tower Cranes: over 250' in height from base to boom	$79.13	7A	11H	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Transporters, All Track Or Truck Type	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Trenching Machines	$75.51	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Truck Crane Oiler/Driver: 100 tons and over	$76.11	7A	11H	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Truck Crane Oiler/Driver: 100 tons and over	$76.11	7A	11H	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Truck crane oiler/driver: under 100 tons	$75.53	7A	11H	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Truck Mount Portable Conveyor	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Vac Truck (Vactor Guzzler, Hydro Excavator)	$76.09	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Welder	$76.77	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Wheel Tractors, Farmall Type	$72.20	15J	11G	8X	View
Kitsap	Power Equipment Operators-Underground Sewer & Water	Yo Yo Pay Dozer	$76.09	15J	11G	8X	View
Kitsap	Power Line Clearance Tree Trimmers	Journey Level In Charge	$57.22	5A	4A		View
Kitsap	Power Line Clearance Tree Trimmers	Spray Person	$54.32	5A	4A		View
Kitsap	Power Line Clearance Tree Trimmers	Tree Equipment Operator	$57.22	5A	4A		View
Kitsap	Power Line Clearance Tree Trimmers	Tree Trimmer	$51.18	5A	4A		View

Kitsap	Power Line Clearance Tree Trimmers	Tree Trimmer Groundperson	$38.99	5A	4A		View
Kitsap	Refrigeration & Air Conditioning Mechanics	Journey Level	$83.96	5A	1G		View
Kitsap	Residential Brick Mason	Journey Level	$22.01		1		View
Kitsap	Residential Carpenters	Journey Level	$26.25		1		View
Kitsap	Residential Cement Masons	Journey Level	$39.88		1		View
Kitsap	Residential Drywall Applicators	Journey Level	$49.92	15J	4C		View
Kitsap	Residential Drywall Tapers	Journey Level	$25.84		1		View
Kitsap	Residential Electricians	Journey Level	$44.11		1		View
Kitsap	Residential Glaziers	Journey Level	$49.80	7L	1H		View
Kitsap	Residential Insulation Applicators	Journey Level	$18.03		1		View
Kitsap	Residential Laborers	Journey Level	$15.74		1		View
Kitsap	Residential Marble Setters	Journey Level	$22.01		1		View
Kitsap	Residential Painters	Journey Level	$20.85		1		View
Kitsap	Residential Plumbers & Pipefitters	Journey Level	$35.92		1		View
Kitsap	Residential Refrigeration & Air Conditioning Mechanics	Journey Level	$40.21		1		View
Kitsap	Residential Sheet Metal Workers	Journey Level	$32.91		1		View
Kitsap	Residential Soft Floor Layers	Journey Level	$22.03		1		View
Kitsap	Residential Sprinkler Fitters (Fire Protection)	Journey Level	$31.53		1		View
Kitsap	Residential Stone Masons	Journey Level	$66.32	7E	1N		View
Kitsap	Residential Terrazzo Workers	Journey Level	$15.74		1		View
Kitsap	Residential Terrazzo/Tile Finishers	Journey Level	$39.09		1		View
Kitsap	Residential Tile Setters	Journey Level	$35.40		1		View
Kitsap	Roofers	Journey Level	$59.05	5A	3H		View
Kitsap	Roofers	Using Irritable Bituminous Materials	$62.05	5A	3H		View
Kitsap	Sheet Metal Workers	Journey Level (Field or Shop)	$94.11	7F	1E		View
Kitsap	Shipbuilding & Ship Repair	New Construction Boilermaker	$39.58	7V	1		View
Kitsap	Shipbuilding & Ship Repair	New Construction Carpenter	$39.58	7V	1		View
Kitsap	Shipbuilding & Ship Repair	New Construction Crane Operator	$39.58	7V	1		View
Kitsap	Shipbuilding & Ship Repair	New Construction Electrician	$39.58	7V	1		View
Kitsap	Shipbuilding & Ship Repair	New Construction Heat & Frost Insulator	$84.58	15H	11C		View
Kitsap	Shipbuilding & Ship Repair	New Construction Laborer	$39.58	7V	1		View
Kitsap	Shipbuilding & Ship Repair	New Construction Machinist	$39.58	7V	1		View
Kitsap	Shipbuilding & Ship Repair	New Construction Operating Engineer	$39.58	7V	1		View
Kitsap	Shipbuilding & Ship Repair	New Construction Painter	$39.58	7V	1		View
Kitsap	Shipbuilding & Ship Repair	New Construction Pipefitter	$39.58	7V	1		View
Kitsap	Shipbuilding & Ship Repair	New Construction Rigger	$39.58	7V	1		View
Kitsap	Shipbuilding & Ship Repair	New Construction Sheet Metal	$39.58	7V	1		View

Kitsap	Shipbuilding & Ship Repair	New Construction Shipfitter	$39.58	7V	1		View
Kitsap	Shipbuilding & Ship Repair	New Construction Warehouse/Teamster	$39.58	7V	1		View
Kitsap	Shipbuilding & Ship Repair	New Construction Welder / Burner	$39.58	7V	1		View
Kitsap	Shipbuilding & Ship Repair	Ship Repair Boilermaker	$50.35	7X	4J		View
Kitsap	Shipbuilding & Ship Repair	Ship Repair Carpenter	$50.95	7X	4J		View
Kitsap	Shipbuilding & Ship Repair	Ship Repair Crane Operator	$45.06	7Y	4K		View
Kitsap	Shipbuilding & Ship Repair	Ship Repair Electrician	$50.42	7X	4J		View
Kitsap	Shipbuilding & Ship Repair	Ship Repair Heat & Frost Insulator	$84.58	15H	11C		View
Kitsap	Shipbuilding & Ship Repair	Ship Repair Laborer	$50.95	7X	4J		View
Kitsap	Shipbuilding & Ship Repair	Ship Repair Machinist	$50.95	7X	4J		View
Kitsap	Shipbuilding & Ship Repair	Ship Repair Operating Engineer	$45.06	7Y	4K		View
Kitsap	Shipbuilding & Ship Repair	Ship Repair Painter	$50.95	7X	4J		View
Kitsap	Shipbuilding & Ship Repair	Ship Repair Pipefitter	$50.95	7X	4J		View
Kitsap	Shipbuilding & Ship Repair	Ship Repair Rigger	$50.35	7X	4J		View
Kitsap	Shipbuilding & Ship Repair	Ship Repair Sheet Metal	$50.35	7X	4J		View
Kitsap	Shipbuilding & Ship Repair	Ship Repair Shipwright	$50.95	7X	4J		View
Kitsap	Shipbuilding & Ship Repair	Ship Repair Warehouse / Teamster	$45.06	7Y	4K		View
Kitsap	Sign Makers & Installers (Electrical)	Journey Level	$55.78	0	1		View
Kitsap	Sign Makers & Installers (Non-Electrical)	Journey Level	$35.73	0	1		View
Kitsap	Soft Floor Layers	Journey Level	$55.56	5A	3J		View
Kitsap	Solar Controls For Windows	Journey Level	$15.74		1		View
Kitsap	Sprinkler Fitters (Fire Protection)	Journey Level	$90.99	5C	1X		View
Kitsap	Stage Rigging Mechanics (Non Structural)	Journey Level	$15.74		1		View
Kitsap	Stone Masons	Journey Level	$66.32	7E	1N		View
Kitsap	Street And Parking Lot Sweeper Workers	Journey Level	$16.00		1		View
Kitsap	Surveyors	Assistant Construction Site Surveyor	$75.53	7A	11H	8X	View
Kitsap	Surveyors	Chainman	$72.22	7A	11H	8X	View
Kitsap	Surveyors	Construction Site Surveyor	$76.79	7A	11H	8X	View
Kitsap	Surveyors	Drone Operator (when used in conjunction with survey work only)	$72.22	7A	11H	8X	View
Kitsap	Surveyors	Ground Penetrating Radar Operator	$72.22	7A	11H	8X	View
Kitsap	Telecommunication Technicians	Journey Level	$60.10	7E	1E		View
Kitsap	Telephone Line Construction - Outside	Cable Splicer	$39.15	5A	2B		View
Kitsap	Telephone Line Construction - Outside	Hole Digger/Ground Person	$26.29	5A	2B		View
Kitsap	Telephone Line Construction - Outside	Telephone Equipment Operator (Light)	$32.72	5A	2B		View

Kitsap	Telephone Line Construction - Outside	Telephone Lineperson	$37.00	5A	2B		View
Kitsap	Terrazzo Workers	Journey Level	$60.36	7E	1N		View
Kitsap	Tile Setters	Journey Level	$60.36	7E	1N		View
Kitsap	Tile, Marble & Terrazzo Finishers	Finisher	$51.19	7E	1N		View
Kitsap	Traffic Control Stripers	Journey Level	$51.90	7A	1K		View
Kitsap	Truck Drivers	Asphalt Mix Over 16 Yards	$71.70	15J	11M	8L	View
Kitsap	Truck Drivers	Asphalt Mix To 16 Yards	$70.86	15J	11M	8L	View
Kitsap	Truck Drivers	Dump Truck	$70.86	15J	11M	8L	View
Kitsap	Truck Drivers	Dump Truck & Trailer	$71.70	15J	11M	8L	View
Kitsap	Truck Drivers	Other Trucks	$71.70	15J	11M	8L	View
Kitsap	Truck Drivers - Ready Mix	Transit Mix	$71.70	15J	11M	8L	View
Kitsap	Well Drillers & Irrigation Pump Installers	Irrigation Pump Installer	$15.74		1		View
Kitsap	Well Drillers & Irrigation Pump Installers	Oiler	$15.74		1		View
Kitsap	Well Drillers & Irrigation Pump Installers	Well Driller	$15.74		1		View

APPENDIX B

GEOTECHNICAL ENGINEERING REPORT

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Technical Memorandum

TO: Mr. Tony Fisher, PE, PMP, Senior Project Manager, BHC Consultants, LLC

FROM: Benjamin Ford, PE

DATE: September 24, 2021

RE: **Summary of Geotechnical Engineering Services**
Kitsap County – Silverdale Pump Station 4 Upgrades
Silverdale, Washington
Project No. 1073020.020.028

Introduction

This memorandum summarizes the results of geotechnical engineering services provided by Landau Associates, Inc. (LAI) in support of the Kitsap County – Silverdale Pump Station 4 (PS-4) Upgrades project in Silverdale, Washington (site; Figure 1). Services were provided in accordance with the scope outlined in Exhibit A of the Subconsultant Services Agreement, authorized on March 12, 2021.

This memorandum has been prepared with information provided by BHC Consultants, LLC (BHC; prime engineer) and Kitsap County Public Works (County; project owner) and with data collected during the field exploration and laboratory testing programs.

Project Understanding

Existing PS-4 is located at the northeast corner of the Fredrickson Road Northwest (NW) and NW Bucklin Hill Road intersection. The County plans to install a new wet well to increase pump station capacity. The new wet well is estimated to measure 20 feet (ft) wide by 34 ft long by 30 ft deep.

To accommodate increased water flow, the County will replace outdated pumping equipment, including pumps and motors; a generator; and power, control, and telemetry panels. The County also proposes to upgrade the gravity sewer along Fredrickson Road NW and to replace the force main on NW Bucklin Hill Road, between Fredrickson Road NW and Spinnaker Boulevard NW. The new gravity sewer will be installed 8 to 12 ft below ground surface (bgs), and the new, 20-inch-diameter force main 6 to 7 ft bgs. The proposed site improvements are shown on Figure 2.

Site Conditions

PS-4 is located in a residential neighborhood, with coniferous and deciduous trees to the north and asphalt-paved roads to the south and west. PS-4 is enclosed by a chain-link fence; a gravel access road skirts the eastern boundary of the fence. Downward, 4 percent slopes are located in the southwest corner of the site.

The site is bounded to the west by Fredrickson Road NW and to the south by NW Bucklin Hill Road. Fredrickson Road NW is generally flat. An approximately 1,700-ft stretch of NW Bucklin Hill Road,

beginning at PS-4 and running east, features upward, 5 percent slopes, extending to the intersection with Spinnaker Boulevard NW.

Geologic Setting

Geologic information for the site and the surrounding area was obtained from the *Geologic Map of the Seabeck and Poulsbo 7.5-minute Quadrangles, Kitsap and Jefferson Counties, Washington* (Polenz et al. 2013). Surficial deposits in the vicinity of the site consist of Vashon lodgment till (Qgt), a mixture of subglacial materials, including clay, silt, sand, pebbles, cobbles, and isolated boulders. The materials in this unit typically are highly compact, unsorted and unstratified with high shear strength and little to no permeability.

The soils observed in LAI's May 2021 explorations were consistent with the mapped geology.

Subsurface Conditions

On May 24, 2021, LAI's drilling subcontractor advanced two hollow-stem auger borings (B-1-21 and B-2-21) at the approximate locations shown on Figure 2. Boring B-1-21 extended 15.9 ft bgs, and boring B-2-21 extended 40.9 ft bgs.

LAI personnel monitored the field explorations, obtained representative soil samples, maintained a detailed log of the subsurface soil and groundwater conditions observed, and described the soil by visual and textural examination. Subsurface conditions were described using the soil classification system shown on Figure 3, in general accordance with ASTM International (ASTM) standard test method D2488. Summary boring logs are presented on Figures 4 and 5. The stratigraphic contacts shown on the logs represent the approximate boundaries between soil types; actual transitions may be more gradual.

Disturbed soil samples were obtained from the borings at frequent intervals, using a 1.5-inch inside-diameter, standard-penetration test split-spoon sampler. A 140-pound automatic hammer, falling approximately 30 inches, was used to drive the sampler 18 inches (or a portion thereof) into the undisturbed soil. The number of blows required to drive the sampler the final 12 inches (or a portion thereof) of soil penetration is noted on the boring logs, adjacent to the appropriate sample notation. Upon completion of drilling and sampling, the boreholes were decommissioned in general accordance with the requirements in Chapter 173-160 of the Washington Administrative Code (WAC).

Samples were transported to LAI's soils laboratory for further examination and testing. Natural moisture content determinations and grain size analyses were performed on select samples. The natural moisture content is shown as W = xx (i.e., percentage of dry weight) in the "Test Data" column on Figures 4 and 5. Samples selected for grain size analysis are designated with a "GS" in the "Test Data" column. The results of the grain size analyses are presented on Figures 6 and 7.

Soil Conditions

The soils observed underlying existing surface conditions (i.e., asphalt pavement or grass) were categorized into three general units:

- **Fill:** Fill was observed beneath the asphalt in boring B-1-21. The fill consisted of loose, fine to coarse sand with gravel; medium dense, sandy gravel; and medium dense, silty sand with gravel. The fill was in a moist condition and extended 3 to 5 ft bgs.
- **Glacial till:** Glacial till was observed beneath the fill in boring B-1-21 and beneath the grass in boring B-2-21. The glacial till consisted of gray sand with variable silt and gravel content or of very sandy gravel with silt. The glacial till was damp to moist and very dense. Borings B-1-21 and B-2-21 were terminated in this unit.

Cobbles and boulders are often found in glacial soils and may be present throughout the site. The contractor should be prepared to manage such oversized material.

Groundwater Conditions

Groundwater was not observed in LAI's May 2021 explorations. The groundwater conditions reported herein are for the specific locations and dates indicated and may not be representative of other locations and/or times. Groundwater conditions will vary depending on local subsurface conditions, weather conditions, and other factors. Site groundwater levels are expected to fluctuate seasonally, with maximum groundwater levels occurring during late winter and early spring.

Conclusions and Recommendations

Based on the results of LAI's geotechnical field explorations and laboratory testing, site subsurface conditions are suitable for the proposed improvements, provided the recommendations herein are incorporated into the project design. The following key points should be considered when developing project plans and specifications.

- **Construction dewatering:** Though not observed in LAI's May 2021 explorations, perched groundwater zones may be encountered, and the need for construction dewatering should be anticipated. Conventional dewatering methods, such as sumps and pumps, should be sufficient to manage minor groundwater seepage. To limit the need for soil dewatering, construction should be completed during the relatively dry period between late summer and early fall.
- **Site soil:** With proper moisture conditioning, native site soils will be suitable for reuse as trench backfill or structural fill. Earthwork should be avoided during heavy and/or extended periods of precipitation.
- **Oversized material:** Boulders and cobbles are often found in glacially derived soils and may be present throughout the site. The contractor should be prepared to manage such oversized material.

- **Excavations:** The wet well excavation is anticipated to extend to a maximum depth of 30 ft bgs. Slide rail or other internally braced shoring systems are considered feasible for wet well installation. Conventional trench boxes are considered feasible for gravity and force main installation, provided the excavations are properly dewatered. The site is underlain by dense glacial till soils; as such, use of cantilever sheet pile shoring systems is not considered feasible.

Seismic Conditions

LAI understands that seismic design will be performed using *2018 International Building Code* standards (ICC 2017). The parameters in Table 1 can be used to compute seismic base shear forces.

Table 1. *2018 International Building Code* Seismic Design Parameters

Spectral response acceleration at short periods (S_S) = 1.465g
Spectral response acceleration at 1-second periods (S_1) = 0.519g
Site class = C
Site coefficient (F_a) = 1.2
Site coefficient (F_v) = 1.481

F_a, F_v = acceleration (0.2-second period) and velocity (1.0-second period) site coefficients, respectively
g = force of gravity
S_s, S_1 = 0.2- and 1.0-second period spectral accelerations, respectively

The site is underlain by very dense, glacially consolidated soil. In LAI's opinion, there is a low risk that seismically induced soil liquefaction or lateral spreading will occur at the site. Given the distance between the site and the nearest known active crustal fault, the risk of ground rupture due to surface faulting is low.

Foundation Support

The foundation design parameters in Table 2 should be used in conjunction with the complete recommendations in this technical memorandum.

Table 2. Summary of Design Parameters for Shallow Foundations

Allowable soil bearing pressure = 3,000 psf
Friction coefficient (factored) = 0.35
Passive resistance (factored) = 330 pcf
Minimum foundation width = 18 inches (continuous), 24 inches (isolated)
Maximum foundation width (for settlement considerations) = 5 ft (continuous), 25 ft (isolated)

ft = feet
pcf = pounds per cubic foot
psf = pounds per square foot

Glacial till soils are likely to be exposed at the foundation elevation of the proposed structures. These soils are anticipated to provide adequate foundation support for underground and on-grade structures, provided they are in a relatively undisturbed condition and properly dewatered.

LAI recommends using a net allowable bearing pressure of 3,000 pounds per square foot for design of below- and on-grade structures. The net allowable bearing pressure includes a factor of safety of at least 3.0 on the calculated ultimate bearing capacity. Less than ½ inch of total settlement is expected to occur as building loads are applied during construction. Post-construction settlement is expected to be negligible. The bearing pressure can be increased by one-third for transient loads, such as those induced by wind and seismic forces.

An allowable coefficient of sliding resistance of 0.35, applied to vertical and dead loads only, can be used to compute frictional resistance acting on the base of footings. This coefficient includes a factor of safety of 1.5 on the calculated ultimate value.

The passive resistance of properly compacted structural fill placed against the sides of the foundations can be considered equivalent to a fluid with a density of 330 pounds per cubic foot (pcf). The foundation passive earth pressure has been reduced by a factor of 1.5 to limit deflections to less than 2 percent of the embedded depth. The passive earth pressure and friction components can be combined, provided the passive component does not exceed two-thirds of the total. The top foot of soil should be excluded from the calculation, unless the foundation perimeter is covered by a slab-on-grade or pavement.

Lateral Earth Pressures

The lateral earth pressures shown on Figure 8 can be used to design the wet well structure. In general, the wet well should be designed to resist at-rest earth pressure, hydrostatic water pressure, temporary construction surcharge, and seismic lateral earth pressures. This design recommendation is based on the assumptions that walls will be restrained against rotation during backfilling; that backfill will be level; and that the surrounding soil will be in a drained, at-rest condition.

Uplift Resistance

Buried, tank-like structures, such as the proposed wet well, will experience an upward, buoyant force when the groundwater level outside of the structure is higher than the fluid level inside the structure. Over time, the excavation may fill with runoff, creating a bathtub effect. The weight of the structure and sidewall soil friction will provide uplift resistance. Extending the base of the wet well foundation beyond the outside of its perimeter would help to increase uplift resistance.

If an extended base slab is used, the weight of the soil overlying the footing can be calculated with an effective wedge, as described in the Naval Facilities Engineering Command's *Design Manual 7.02*

(1986) and shown on Figure 9. Uplift should be calculated using a soil unit weight of 73 pcf for buoyant conditions.

Alternatively, sidewall soil friction between the outside of the structure and the surrounding backfill can be used for uplift resistance. To calculate frictional resistance, LAI recommends using a lateral soil earth pressure of 30 pcf and a coefficient of friction (tanδ) of 0.35 for epoxy-coated structures, 0.57 for cast-in-place structures, and 0.45 for precast concrete structures.

Sidewall soil friction and extended base slabs are alternative methods of uplift resistance and should not be used in conjunction.

Slabs-On-Grade

A modulus of vertical subgrade reaction (subgrade modulus) can be used to design slabs-on-grade for the new pump station structure and similar equipment pad foundations. The subgrade modulus will vary based on the dimensions of the slab and the magnitude of applied loads on the slab surface; slabs with larger dimensions and loads are influenced by soils to a greater depth. LAI recommends using a subgrade modulus of 200 pounds per cubic inch to design slabs-on-grade. This subgrade modulus is for a 1-ft by 1-ft square plate and is not the overall modulus of a larger area.

Construction Considerations

The following key points should be considered when developing project plans and specifications:

- **Site soils:** Site soils are moisture sensitive and exhibit a fines content of 5 to 30 percent. Earthwork should be avoided during heavy and/or extended periods of precipitation. If reused as structural fill or trench backfill, site soils should be moisture conditioned and screened for constituents greater than 6 inches in diameter.
- **Subgrade preparation:** Prior to placement of pipe bedding, structural fill, or formwork, the upper 1 ft of subgrade should be scarified; moisture conditioned; and compacted to a firm, unyielding condition. Scarification and moisture conditioning can be omitted if native glacial till is undisturbed.

  The prepared subgrade should be proof-rolled in the presence of a qualified geotechnical engineer, who is familiar with the site and can check for soft/disturbed areas. Areas of limited access can be evaluated with a steel T-probe. Soft and/or disturbed subgrade should be overexcavated and replaced with compacted structural fill.
- **Construction dewatering:** The need for construction dewatering should be anticipated by the contractor. Conventional dewatering methods, such as sumps and pumps, should be sufficient to manage minor groundwater seepage. To limit the need for soil dewatering, construction should be completed during the relatively dry period between late summer and early fall. The contractor should be responsible for the design, monitoring, and maintenance of dewatering systems.

- **Shallow shoring methods:** Trench boxes should provide suitable support for shallow excavations along the new force main and gravity sewer alignments, provided settlement-sensitive structures and utilities are not located adjacent to the excavations. One or both sides of the trench may cave against the box, and caving could extend a distance equal to the depth of the excavation. Additional bracing or sheeting may be required where the edge of the excavation is separated from settlement-sensitive structures and utilities by a distance less than 1½ of the excavation depth.
- **Deep shoring methods:** The wet well excavation is anticipated to extend approximately 30 ft bgs. Slide rail or other internally braced shoring systems are considered feasible for wet well installation. Because the site is underlain by dense glacial till soils, the use of cantilever sheet pile shoring systems is not considered feasible. Adjacent settlement-sensitive structures and utilities should be considered when selecting a shoring method.
- **Utility trench excavation and backfill:** LAI anticipates that utility trenches will be excavated in medium dense to very dense glacial till. A heavy-duty hydraulic excavator should be able to excavate trenches to the required depths. A smooth-bladed bucket should be used to remove loose and/or disturbed soil from the trench bottom. The final trench bottom should be firm and free of roots, topsoil, lumps of silt and clay, and organic and inorganic debris. Unsuitable soil should be overexcavated and replaced with suitable foundation material. Trench backfill should be placed in loose, horizontal lifts, no more than 8 inches thick. The backfill should be compacted to at least 95 percent of the maximum density, determined in accordance with the compaction control tests described in Section 2-03.3(14)D of the Washington State Department of Transportation's 2021 *Standard Specifications for Road, Bridge, and Municipal Construction* (*2021 WSDOT Standard Specifications*). Alternatively, the MDD can be determined using ASTM standard test method D1557 (i.e., modified Proctor).
- **Temporary excavations:** Temporary excavations should be completed in accordance with the requirements in Section 2-09 of the *2021 WSDOT Standard Specifications.* The contractor should be responsible for actual excavation configurations and the maintenance of safe working conditions, including temporary excavation stability. Temporary excavations in excess of 4 ft should be shored or sloped in accordance with the requirements outlined in Safety Standards for Construction Work, Part N (WAC Chapter 296-155). The soil likely to be exposed in the wet well excavations should be considered Type B, with a maximum allowable excavation inclination of 1 horizontal to 1 vertical (1H:1V). The soil likely to be exposed in the excavations along Fredrickson Road NW and NW Bucklin Hill Road should be considered Type C, with a maximum allowable excavation inclination of 1½H:1V. All applicable local, state, and federal safety codes should be followed.

  If excavation instability is detected, the contractor should flatten the side slopes or install temporary shoring. If groundwater seepage is present, and the excavation is not properly dewatered, the soil may be prone to caving, channeling, and running. Temporary shoring should be designed in accordance with the soil parameters presented in Table 3.

Table 3. Recommended Soil Parameters for Design of Temporary Shoring

Soil Unit	Moist Unit Weight (pcf)	Submerged Unit Weight (pcf)	Cohesion (psf)	Internal Angle of Friction (degrees)
Fill	125	63	0	32
Glacial till	130	68	0	36

pcf = pounds per cubic foot
psf = pounds per square foot

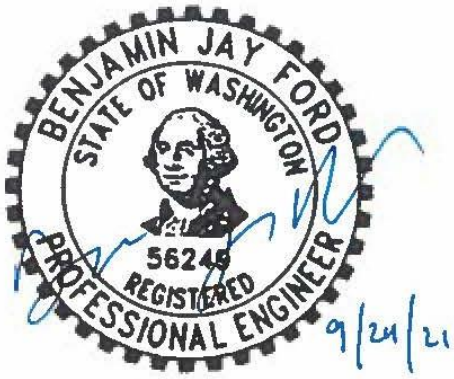
Use of This Technical Memorandum

Landau Associates has prepared this technical memorandum for the exclusive use of BHC Consultants, LLC and Kitsap County Public Works for specific application to the Kitsap County – Silverdale Pump Station 4 Upgrades project in Silverdale, Washington. No other party is entitled to rely on the information, conclusions, and recommendations included in this document without the express written consent of Landau Associates. Reuse of the information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review and authorization by Landau Associates, shall be at the user's sole risk. Landau Associates warrants that, within the limitations of scope, schedule, and budget, its services have been provided in a manner consistent with that level of skill and care ordinarily exercised by members of the profession currently practicing in the same locality, under similar conditions as this project. Landau Associates makes no other warranty, either express or implied.

Closing

We appreciate the opportunity to provide geotechnical services for this project. If you have questions or comments, or if we can be of further service, please contact Benjamin Ford at (360) 791-3178 or at bford@landauinc.com.

LANDAU ASSOCIATES, INC.



Benjamin Ford, PE
Associate

BJF/CAL/mcs
[\\OLYMPIA1\PROJECTS\1073\020.020\028\R\REVISED\KITSAP COUNTY – SILVERDALE PUMP STATION 4 UPGRADES TECHNICAL MEMORANDUM 9.24.2021.DOCX]

Attachments: Figure 1. Vicinity Map
Figure 2. Site and Exploration Plan
Figure 3. Soil Classification System and Key
Figures 4 and 5. Logs of Borings B-1-21 and B-2-21
Figures 6 and 7. Grain Size Distribution
Figure 8. Lateral Earth Pressure Diagrams
Figure 9. Extended Base Buoyancy Calculation

References

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Data Source: Esri.

G:\Projects\1073\020\020\028\F01VicMap (PS4)_CAL.mxd 5/24/2021

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Silverdale Pump Station 4 Upgrades Silverdale, Washington	**Vicinity Map**	Figure 1

Legend

B-1 Approximate Boring Location and Designation

Note

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Source: Google Imagery 2020

Landau Associates | Y:\CAD\1073\020.020\028_CAL_rev1.dwg | 9/23/2021 3:20 PM | caduser

LANDAU ASSOCIATES

Silverdale Pump Station 4 Upgrades Silverdale, Washington	**Site and Exploration Plan**	Figure 2

Soil Classification System

MAJOR DIVISIONS			GRAPHIC SYMBOL	USCS LETTER SYMBOL[1]	TYPICAL DESCRIPTIONS [2][3]
COARSE-GRAINED SOIL (More than 50% of material is larger than No. 200 sieve size)	GRAVEL AND GRAVELLY SOIL (More than 50% of coarse fraction retained on No. 4 sieve)	CLEAN GRAVEL (Little or no fines)		GW	Well-graded gravel; gravel/sand mixture(s); little or no fines
				GP	Poorly graded gravel; gravel/sand mixture(s); little or no fines
		GRAVEL WITH FINES (Appreciable amount of fines)		GM	Silty gravel; gravel/sand/silt mixture(s)
				GC	Clayey gravel; gravel/sand/clay mixture(s)
	SAND AND SANDY SOIL (More than 50% of coarse fraction passed through No. 4 sieve)	CLEAN SAND (Little or no fines)		SW	Well-graded sand; gravelly sand; little or no fines
				SP	Poorly graded sand; gravelly sand; little or no fines
		SAND WITH FINES (Appreciable amount of fines)		SM	Silty sand; sand/silt mixture(s)
				SC	Clayey sand; sand/clay mixture(s)
FINE-GRAINED SOIL (More than 50% of material is smaller than No. 200 sieve size)	SILT AND CLAY (Liquid limit less than 50)			ML	Inorganic silt and very fine sand; rock flour; silty or clayey fine sand or clayey silt with slight plasticity
				CL	Inorganic clay of low to medium plasticity; gravelly clay; sandy clay; silty clay; lean clay
				OL	Organic silt; organic, silty clay of low plasticity
	SILT AND CLAY (Liquid limit greater than 50)			MH	Inorganic silt; micaceous or diatomaceous fine sand
				CH	Inorganic clay of high plasticity; fat clay
				OH	Organic clay of medium to high plasticity; organic silt
	HIGHLY ORGANIC SOIL			PT	Peat; humus; swamp soil with high organic content

OTHER MATERIALS	GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
PAVEMENT		AC or PC	Asphalt concrete pavement or Portland cement pavement
ROCK		RK	Rock (See Rock Classification)
WOOD		WD	Wood, lumber, wood chips
DEBRIS		DB	Construction debris, garbage

Notes:
1. USCS letter symbols correspond to symbols used by the Unified Soil Classification System and ASTM classification methods. Dual letter symbols (e.g., SP-SM for sand or gravel) indicate soil with an estimated 5-15% fines. Multiple letter symbols (e.g., ML/CL) indicate borderline or multiple soil classifications.
2. Soil descriptions are based on the general approach presented in the Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), outlined in ASTM D 2488. Where laboratory index testing has been conducted, soil classifications are based on the Standard Test Method for Classification of Soils for Engineering Purposes, as outlined in ASTM D 2487.
3. Soil description terminology is based on visual estimates (in the absence of laboratory test data) of the percentages of each soil type and is defined as follows:

Primary Constituent:	> 50%	- "GRAVEL," "SAND," "SILT," "CLAY," etc.
Secondary Constituents:	> 30% and ≤ 50%	- "very gravelly," "very sandy," "very silty," etc.
	> 15% and ≤ 30%	- "gravelly," "sandy," "silty," etc.
Additional Constituents:	> 5% and ≤ 15%	- "with gravel," "with sand," "with silt," etc.
	≤ 5%	- "with trace gravel," "with trace sand," "with trace silt," etc., or not noted.

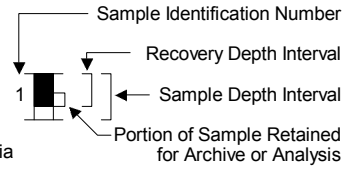
4. Soil density or consistency descriptions are based on judgement using a combination of sampler penetration blow counts, drilling or excavating conditions, field tests, and laboratory tests, as appropriate.

Drilling and Sampling Key

SAMPLER TYPE

Code	Description
a	3.25-inch O.D., 2.42-inch I.D. Split Spoon
b	2.00-inch O.D., 1.50-inch I.D. Split Spoon
c	Shelby Tube
d	Grab Sample
e	Single-Tube Core Barrel
f	Double-Tube Core Barrel
g	2.50-inch O.D., 2.00-inch I.D. WSDOT
h	3.00-inch O.D., 2.375-inch I.D. Mod. California
i	Other - See text if applicable
1	300-lb Hammer, 30-inch Drop
2	140-lb Hammer, 30-inch Drop
3	Pushed
4	Vibrocore (Rotosonic/Geoprobe)
5	Other - See text if applicable

SAMPLE NUMBER & INTERVAL



Field and Lab Test Data

Code	Description
PP = 1.0	Pocket Penetrometer, tsf
TV = 0.5	Torvane, tsf
PID = 100	Photoionization Detector VOC screening, ppm
W = 10	Moisture Content, %
D = 120	Dry Density, pcf
-200 = 60	Material smaller than No. 200 sieve, %
GS	Grain Size - See separate figure for data
AL	Atterberg Limits - See separate figure for data
GT	Other Geotechnical Testing
CA	Chemical Analysis

Groundwater

▽ Approximate water level at time of drilling (ATD)

▼ Approximate water level at time after drilling/excavation/well

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Silverdale Pump Station
4 Upgrades
Silverdale, Washington

Soil Classification System and Key

Figure 3

B-1-21

LAI Project No: 1073020.020.028

SAMPLE DATA | **SOIL PROFILE**

Drilling Method: Hollow-Stem Auger
Ground Elevation (ft): Not Measured
Drilled By: Holocene Drilling Inc.
Logged By: CAL Date: 05/24/21

Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Soil Description	Groundwater
0							AC	5 inches of asphalt	Groundwater Not Encountered
							SP	Dark brown to brown, fine to coarse SAND with gravel (loose, damp to moist) **(FILL)**	
		S-1	b2	5				- Grades to orange-brown at 2.5 ft bgs	
5		S-2	b2	65			SW-SM	Gray-brown, gravelly, well-graded SAND with silt (very dense, damp to moist) **(GLACIAL TILL)**	
		S-3	d2	50/2"	W = 8 GS			- Minor orange mottling observed between 5 and 6 ft bgs - Observed minor drill chatter between 7 ft and 9 ft bgs	
10		S-4	b2	50/6"				- Grades to gray and with gravel at 10 ft bgs	
		S-5	b2	50/4"	W = 7 GS		SM	Gray, silty, fine to coarse SAND with gravel (very dense, moist)	
15		S-6	b2	50/5"					
20									
25									

Moisture Content (%) — Plastic Limit — Liquid Limit
20 40 60 80
▲ SPT N-Value ▲
△ Non-Standard N-Value △
20 40 60 80
× Fines Content (%) ×
20 40 60 80

50/2" △
50/6" ▲
50/4" ▲
50/5" ▲

Boring Completed 05/24/21
Total Depth of Boring = 15.9 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1073020.020.028 9/24/21 C:\USERS\MSKINNER\DESKTOP\1073020.020.028.GPJ SOIL BORING LOG WITH GRAPH

LANDAU ASSOCIATES

Silverdale Pump Station
4 Upgrades
Silverdale, Washington

Log of Boring B-1-21

Figure 4

B-2-21

LAI Project No: 1073020.020.028

SAMPLE DATA | **SOIL PROFILE**

Drilling Method: Hollow-Stem Auger
Ground Elevation (ft): Not Measured
Drilled By: Holocene Drilling Inc.
Logged By: CAL Date: 05/24/21

Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Soil Description	Groundwater	Moisture Content (%) / SPT N-Value / Fines Content (%)
0		S-1	b2	50/5"	W = 3 GS		GP-GM	Brown to gray, very sandy, fine to coarse GRAVEL with silt (loose to medium dense, damp) **(GLACIAL TILL)**	Groundwater Not Encountered	50/5"
								- Grades to gray, damp to moist, and very dense at 2.5 ft bgs		
								- Observed drill chatter between 4 and 5 ft bgs		
5		S-2	b2	50/4"			SM	Silty, fine to coarse SAND with gravel (very dense, damp to moist)		50/4"
		S-3	b2	50/2"	W = 8 GS					50/2"
10		S-4	b2	50/6"				- Grades to moist at 10 ft bgs		50/6"
		S-5	b2	50/6"	W = 6 GS			- Observed minor drill chatter between 14 and 15 ft bgs		50/6"
15		S-6	b2	50/6"						50/6"
		S-7	b2	50/4"	GS					50/4"
20		S-8	b2	50/5"						50/5"
		S-9	b2	50/4"	GS		SP-SM	Gray, fine to coarse SAND with silt and gravel (very dense, moist)		50/4"
25		S-10	b2	50/5"						50/5"

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1073020.020.028 9/24/21 C:\USERS\MSKINNER\DESKTOP\1073020.020.028.GPJ SOIL BORING LOG WITH GRAPH

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Silverdale Pump Station
4 Upgrades
Silverdale, Washington

Log of Boring B-2-21

Figure 5 (1 of 2)

B-2-21

LAI Project No: 1073020.020.028

SAMPLE DATA | **SOIL PROFILE**

Drilling Method: Hollow-Stem Auger
Ground Elevation (ft): Not Measured
Drilled By: Holocene Drilling Inc.
Logged By: CAL Date: 05/24/21

Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Soil Description	Groundwater
							SP-SM	Gray, fine to coarse SAND with silt and gravel (very dense, moist)	Groundwater Not Encountered
30		S-11	b2	50/ 5"	GS		SM	Gray, silty, fine to coarse SAND with gravel (very dense, moist)	
35		S-12	b2	50/ 4"					
40		S-13	b2	50/ 4"					
45									
50									
55									

Moisture Content (%)
Plastic Limit — Liquid Limit
20 40 60 80

▲ SPT N-Value ▲
△ Non-Standard N-Value △
20 40 60 80

× Fines Content (%) ×
20 40 60 80

50/ 5"
50/ 4"
50/ 4"

Boring Completed 05/24/21
Total Depth of Boring = 40.9 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1073020.020.028 9/24/21 C:\USERS\MSKINNER\DESKTOP\1073020.020.028.GPJ SOIL BORING LOG WITH GRAPH

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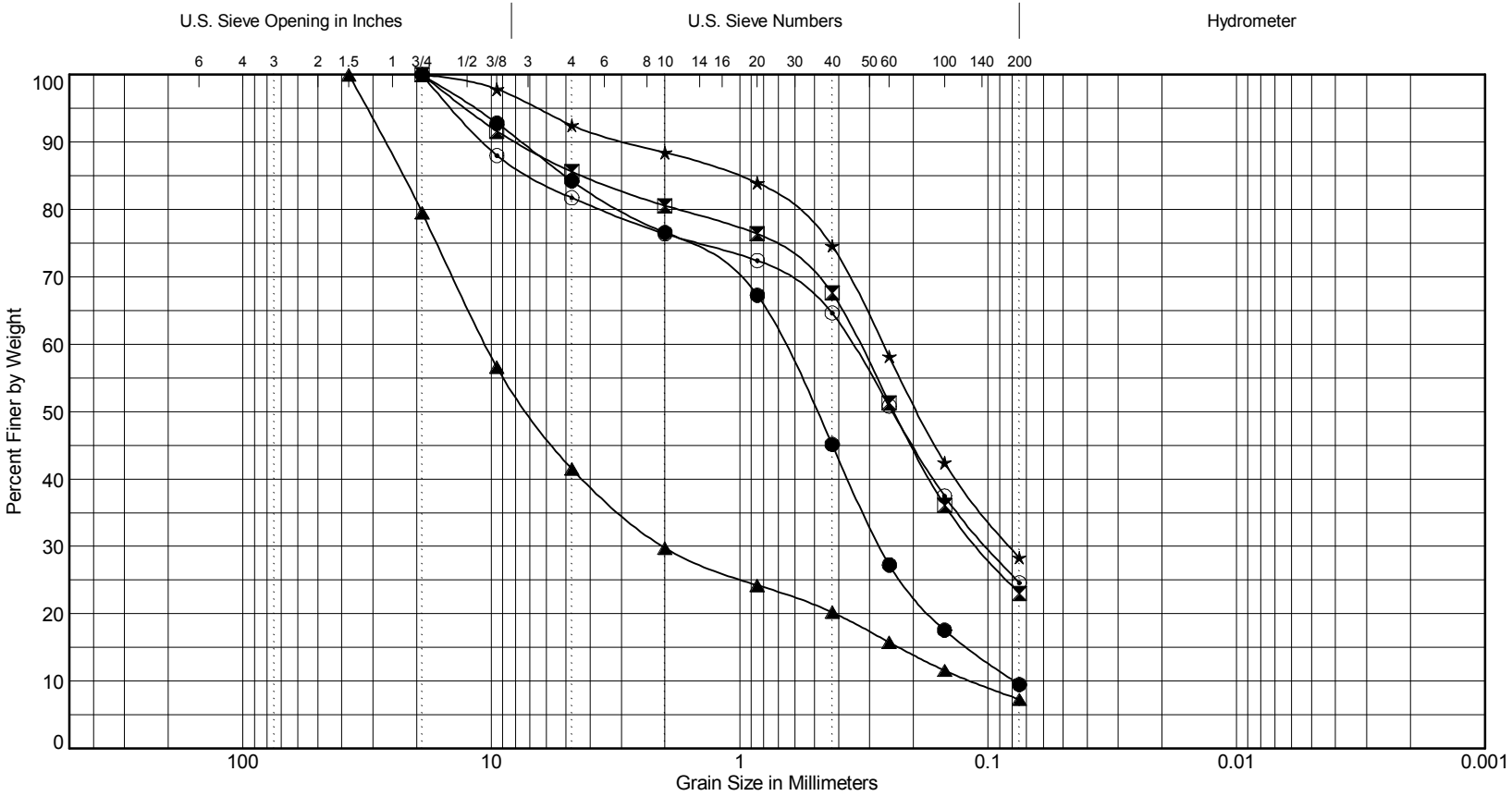
Silverdale Pump Station
4 Upgrades
Silverdale, Washington

Log of Boring B-2-21

Figure 5 (2 of 2)



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Exploration Number	Sample Number	Depth (ft)	Natural Moisture (%)	Soil Description	Unified Soil Classification
●	B-1-21	S-3	8.0	8	Gravelly, well-graded SAND with silt	SW-SM
⧓	B-1-21	S-5	12.5	7	Silty, fine to coarse SAND with gravel	SM
▲	B-2-21	S-1	2.5	3	Very sandy, fine to coarse GRAVEL with silt	GP-GM
★	B-2-21	S-3	7.5	8	Silty, fine to coarse SAND with gravel	SM
⊙	B-2-21	S-5	12.5	6	Gravelly, silty, fine to coarse SAND	SM

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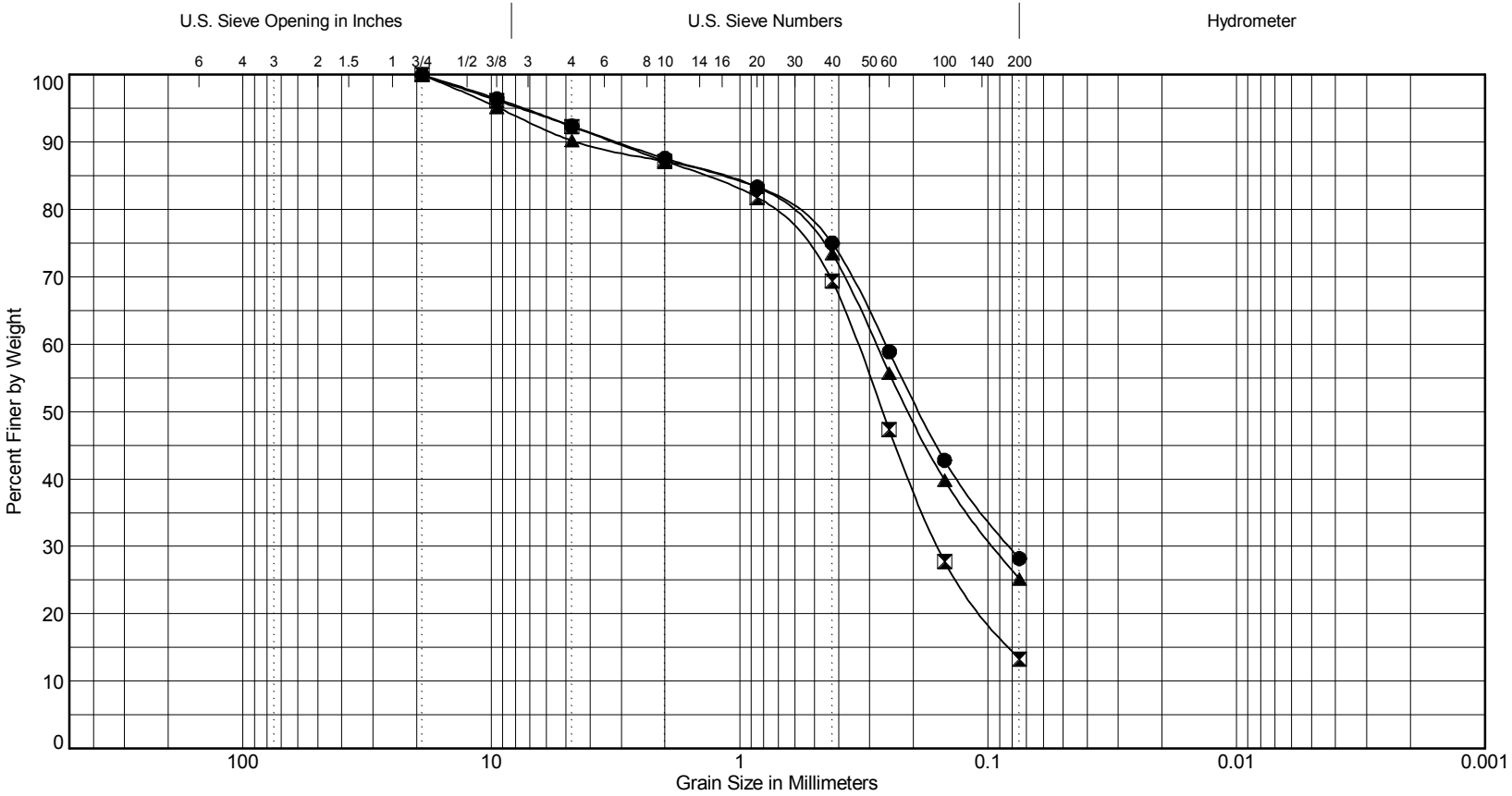
Silverdale Pump Station
4 Upgrades
Silverdale, Washington

Grain Size Distribution

Figure
6



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

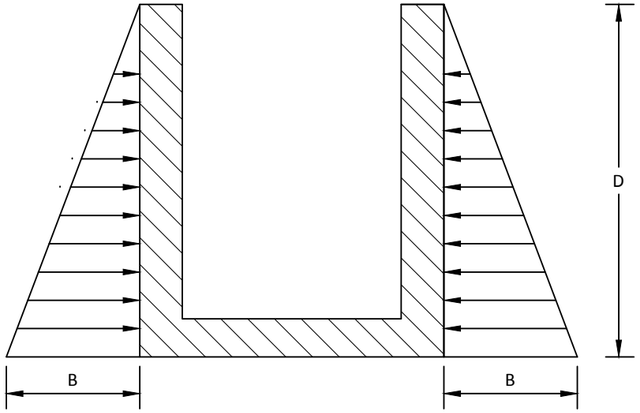
Symbol	Exploration Number	Sample Number	Depth (ft)	Natural Moisture (%)	Soil Description	Unified Soil Classification
●	B-2-21	S-7	17.5		Silty, fine to coarse SAND with gravel	SM
⧓	B-2-21	S-9	22.5		Fine to coarse SAND with silt and gravel	SP-SM
▲	B-2-21	S-11	30.0		Silty, fine to coarse SAND with gravel	SM

LANDAU ASSOCIATES

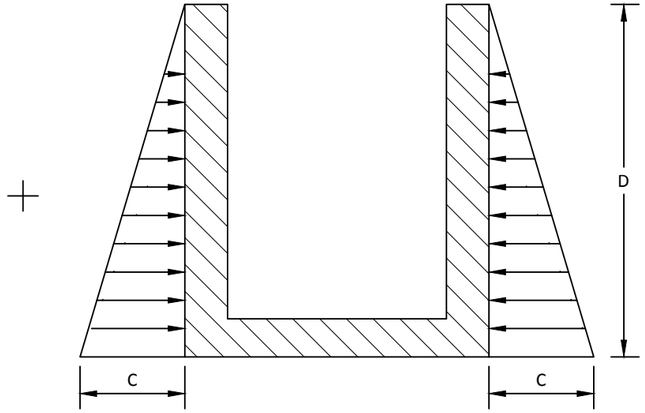
Silverdale Pump Station
4 Upgrades
Silverdale, Washington

Grain Size Distribution

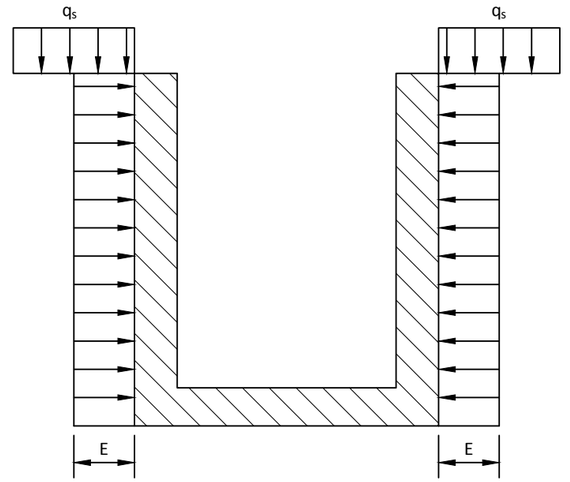
Figure
7



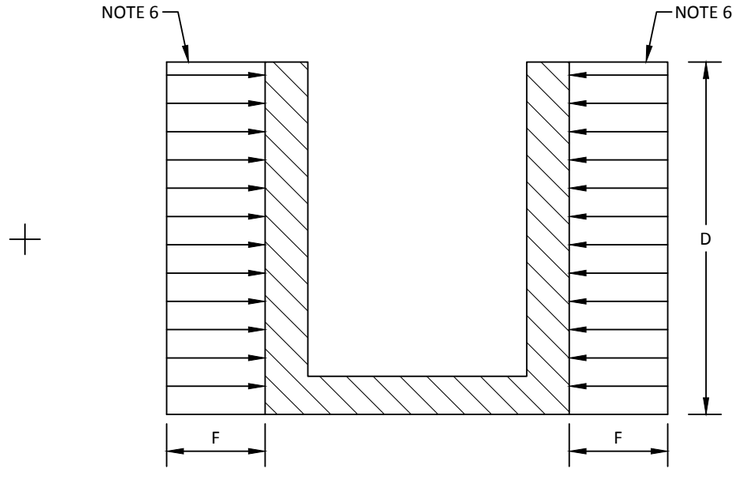
WET WELL WALL AT-REST
EARTH PRESSURE



HYDROSTATIC
PRESSURE



TRAFFIC OR TEMPORARY CONSTRUCTION
SURCHARGE



SEISMIC INCREMENT

B	C	E	F
27.6(D)	62.4(D)	$0.41q_s$	15(D)

TABLE 2: SOIL PARAMETERS

	K_a	K_o	K_p	γ_m/γ_{sat}	c (psf)	ϕ (deg)
SOFT/LOOSE TO MEDIUM DENSE SILT AND SAND	0.26	0.41	3.85	130	0	36

LATERAL EARTH PRESSURE NOTES

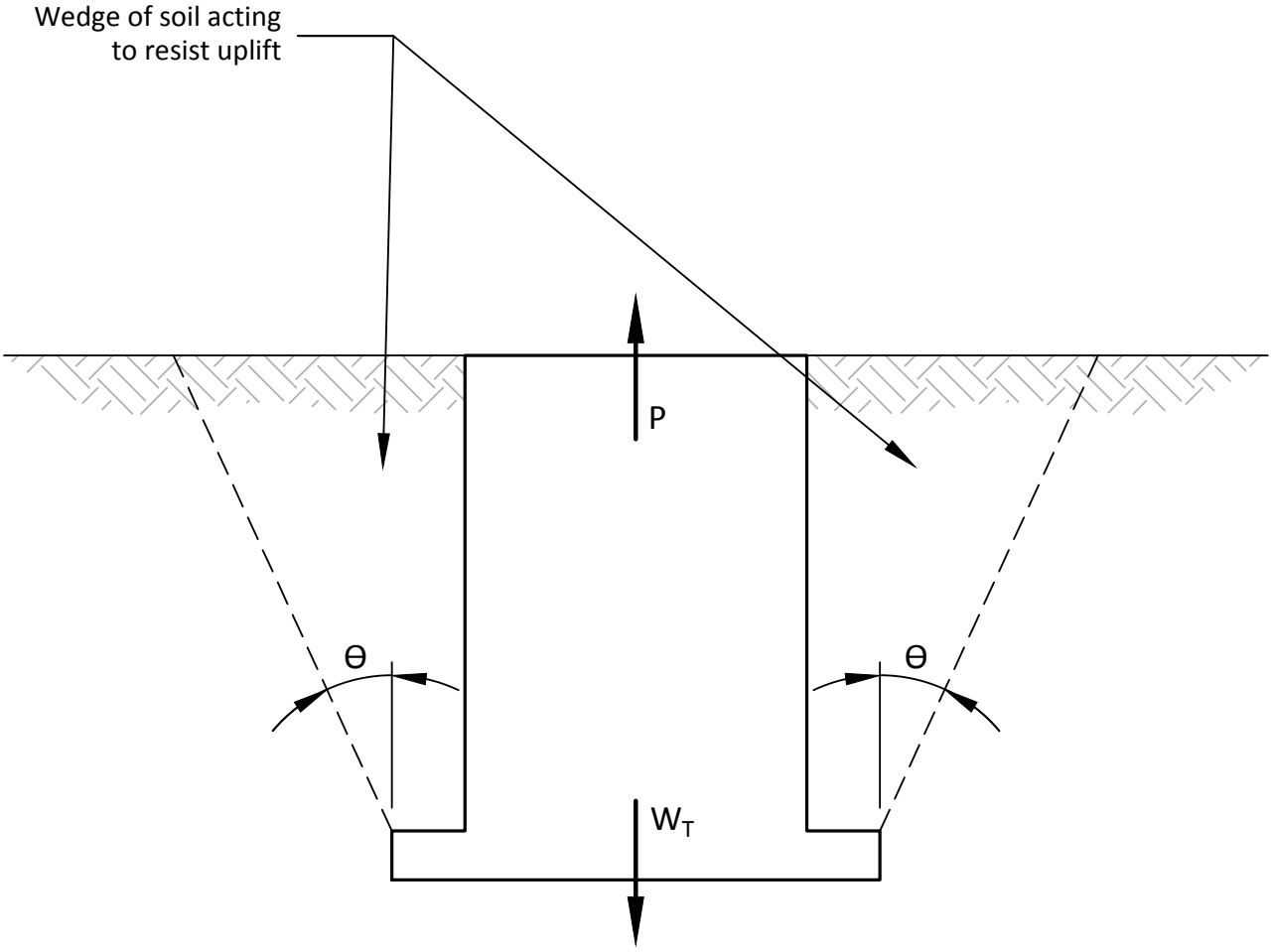
1. ALL PRESSURES ARE PRESENTED IN POUNDS PER SQUARE FOOT (PSF); ALL DIMENSIONS ARE IN FEET.
2. SURCHARGES (q_S) FROM TRAFFIC AND CONSTRUCTION EQUIPMENT COMMONLY ARE ACCOMMODATED WITH A UNIFORM PRESSURE OF 250 PSF. SURCHARGE LOADS GREATER THAN 250 PSF, SUCH AS THOSE FROM CRANES OR TALL STOCKPILES, ALSO SHOULD BE INCORPORATED INTO WALL DESIGN.
3. SEISMIC INCREASE WAS OBTAINED USING THE MONONOBE-OKABE METHOD.
4. HYDROSTATIC PRESSURE SHOULD BE APPLIED ACROSS THE FULL HEIGHT OF THE STRUCTURE.
5. LATERAL EARTH PRESSURES ARE BASED ON RIGID WALL AND AT-REST CONDITIONS.
6. SEISMIC INCREMENT ACTS ON APPROXIMATELY ONE-HALF OF THE WELL STRUCTURE AT ANY GIVEN TIME DURING A SEISMIC EVENT. STATIC EARTH AND HYDROSTATIC PRESSURES MAY BE CONSIDERED AXISYMMETRIC ABOUT THE VERTICAL STRUCTURE AXIS, BUT SEISMIC STRUCTURAL DESIGN OF THE WELL SHOULD ACCOUNT FOR AN UNBALANCED SEISMIC PRESSURE.

LANDAU ASSOCIATES

Silverdale Pump Station
4 Upgrades
Silverdale, Washington

Lateral Earth Pressure Diagrams

Figure
8



Legend

W_T = Weight of structure plus weight of soil wedge. Use γ_B = 73 pounds per cubic foot for soil weight.

P = Buoyancy force

Factor of Safety = W_T/P

Θ = 20°

Source: Naval Facilities Engineering Command Design Manual 7.2 1986

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Silverdale Pump Station
4 Upgrades
Silverdale, Washington

Extended Base Buoyancy Calculations

Figure
9

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APPENDIX C

STORM WATER POLLUTION PREVENTION PLAN

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Construction Stormwater General Permit (CSWGP)

Stormwater Pollution Prevention Plan (SWPPP)

for

Central Kitsap Silverdale
Silverdale Conveyance System and Pump Station 4 Upgrades – Schedules A, B, and C

Prepared for:
Department of Ecology
Northwest Regional Office

Permittee / Owner	Developer	Operator / Contractor
Kitsap County Wastewater Division	Kitsap County Wastewater Division	To Be Determined

Kitsap County

Certified Erosion and Sediment Control Lead (CESCL)

Name	Organization	Contact Phone Number
To Be Determined	To Be Determined	To Be Determined

SWPPP Prepared By

Name	Organization	Contact Phone Number
Margarita Rodriguez / Tony Fisher, PE	BHC Consultants, LLC	206-505-3400

SWPPP Preparation Date

November 9, 2022

Project Construction Dates

Activity / Phase	Start Date	End Date
Construction	To Be Determined	To Be Determined

Table of Contents

List of Tables

List of Appendices

List of Acronyms and Abbreviations

Acronym / Abbreviation	Explanation
303(d)	Section of the Clean Water Act pertaining to Impaired Waterbodies
BFO	Bellingham Field Office of the Department of Ecology
BMP(s)	Best Management Practice(s)
CESCL	Certified Erosion and Sediment Control Lead
CO_2	Carbon Dioxide
CRO	Central Regional Office of the Department of Ecology
CSWGP	Construction Stormwater General Permit
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	Dissolved Oxygen
Ecology	Washington State Department of Ecology
EPA	United States Environmental Protection Agency
ERO	Eastern Regional Office of the Department of Ecology
ERTS	Environmental Report Tracking System
ESC	Erosion and Sediment Control
GULD	General Use Level Designation
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric Turbidity Units
NWRO	Northwest Regional Office of the Department of Ecology
pH	Power of Hydrogen
RCW	Revised Code of Washington
SPCC	Spill Prevention, Control, and Countermeasure
su	Standard Units
SWMMEW	Stormwater Management Manual for Eastern Washington
SWMMWW	Stormwater Management Manual for Western Washington
SWPPP	Stormwater Pollution Prevention Plan
TESC	Temporary Erosion and Sediment Control
SWRO	Southwest Regional Office of the Department of Ecology
TMDL	Total Maximum Daily Load
VFO	Vancouver Field Office of the Department of Ecology
WAC	Washington Administrative Code
WSDOT	Washington Department of Transportation
WWHM	Western Washington Hydrology Model

Project Information (1.0)

The project will be constructed under one contract with three schedules to facilitate tracking of the various improvements. The three schedules are:

- Schedule A – Fredrickson Cleanouts and LS 4 Force Main on Bucklin Hill Road
- Schedule B – Gravity Sewers on Carlton and Force Main on McConnell
- Schedule C - Pump Station 4 Upgrades

Street/Locations: The projects vary in location. The Schedule A upgrades are located just east of Silverdale and consist of replacing the existing 14-inch Pump Station 4 force main with a new 20-inch force main along NW Bucklin Hill Road from Fredrickson Road NW to the top of a hill about 300 feet east of Spinnaker Blvd NW. The new force main will be connected to an existing 20-inch force main that will then convey flows to the Central Kitsap Wastewater Treatment Plant. Schedule A will also include the installation of several cleanouts on side sewers along Fredrickson Road NW between NW Bucklin Hill Road and NW Chena Road.

The Schedule B upgrades are located in downtown Silverdale and consist of a new 15-inch gravity sewer main along NW Carlton Road from Pacific Avenue NW to Washington Avenue NW and a new 12-inch sewer force main along McConnell Avenue NW from NW Byron Street to NW Carlton Street. The new 12-inch force main will divert flows from Kitsap County's Pump Station 12 to the new 15-inch gravity sewer being installed within NW Carlton Street. This will allow the gravity sewer between Byron Street and the County's Pump Station 3 to be abandoned to facilitate development of the Silverdale Waterfront Park by the Port of Silverdale.

The Schedule C upgrades (Schedule C) are located on a lot at the northeast corner of the intersection of NW Bucklin Hill Road and Fredrickson Road NW within Kitsap County just east of Silverdale and consist of upgrades to the County's existing Pump Station 4 to increase that station's pumping capacity and to increase its operational reliability. The site lacks an address, but the parcel number is 4406-000-001-0001 and is in Section 16, Township 25, Range 1E (SE/4).

Existing Conditions (1.1)

Schedule A

Fredrickson Road NW slopes from north to south towards NW Bucklin Hill Road. NW Bucklin Hill Road slopes from east to west. The Schedule A upgrades will disturb approximately 19,500 sf (0.45 acres) of existing road surface and adjacent shoulders. No buildings or other structures will be disturbed by construction.

Schedule B

NW Carlton Street is mostly flat with a slight slope from west to east. McConnel Avenue NW is also mostly flat with a slight slope from north to south. The Schedule B upgrades will disturb approximately 31,600 sf (0.73 acres) of existing road surface and adjacent shoulders. No buildings or other structures will be disturbed by construction.

Schedule C

The Schedule C upgrades consist of the installation of a new wet well, modifications to the existing wet well, expansion of the existing underground dry well, replacement of the existing

above ground control building, and the construction of a new access driveway, sidewalks, retaining wall, and a biofiltration bed. A new generator will be located between the new control building and Fredrickson Road NW in a sound attenuated housing. The upgrades will disturb most of the existing 13,245 sf (0.30 acre) lot.

The pump station site generally slopes from north to south and from east to west towards NW Bucklin Hill Road and Fredrickson Road NW at slopes that range from 0 to 5 percent.

List of known impairments for 303(d) listed or Total Maximum Daily Load (TMDL) for the receiving waterbody:

The Kitsap County critical areas map, NWI map, and USGS topographic map do not identify wetlands in the project vicinity. As such, there are no known impairments or Total Maximum Daily Load (TMDL) issues. The consultant is unaware of any known or suspected contaminants onsite. However, construction could result in fuel spill, sanitary sewer spills, and sediment transfer (TESC issues).

Proposed Construction Activities (1.2)

Description of site development:

Schedule A – Fredrickson Cleanouts and LS 4 Force Main on Bucklin Hill Road

The work included in Schedule A will add cleanouts to several sanitary side sewers along Fredrickson Road NW to improve maintenance access. In addition, the existing 14-inch sewer force main along NW Bucklin Hill Road from Pump Station 4 to Spinnaker Blvd NW will be replaced with a new 20-inch sewer force main to address the velocities that will result from the increased pump rates at Pump Station 4. An air/vacuum vault will be installed at the high point in the system near Spinnaker Blvd NW to allow air to escape the force main and to prevent vacuum conditions from forming in the force main, which could lead to pipe collapse.

Schedule B – Gravity Sewers on Carlton and Force Main on McConnell

The work included in Schedule B will involve the construction of a new 15-inch gravity sewer along NW Carlton Road from Pacific Avenue NW to Washington Avenue NW. This sewer will divert flows from Silverdale Way NW and NW Anderson Hill Road that are creating capacity issues in the gravity conveyance system between NW Carlton Street and Pump Station 3.

In addition, a 12-inch sewer force main will be constructed along McConnel Avenue NW between NW Byron Street and NW Carlton Street. The new force main will redirect flow from Pump Station 12 to the new gravity sewer being constructed along NW Carlton Street, thus addressing capacity restrictions in other parts of the County's conveyance system. Redirecting the flows will also allow a portion of gravity sewer main to be removed from service to facilitate the Port of Silverdale's plans for the development of the Silverdale Waterfront Park.

Schedule C - Pump Station 4 Upgrades

The size of the pump station area is approximately 13,245 square feet. To accommodate increased sanitary sewer flows, Kitsap County will upgrade the existing triplex wet well/dry well pump station by constructing a new wet well to accommodate new submersible pumps, expanding the existing dry well to house new valves, piping, and a pig launch, and converting the existing wet well to overflow storage. The existing control building will be replaced with a new control building that will house the electrical control panels. Backup emergency power will

be provided by a stand-alone diesel generator in a sound-attenuating enclosure. Other site improvements will include a new access driveway, sidewalks, retaining walls, and biofiltration bed with grading as required.

In addition to the pump station, existing related underground conveyance facilities will be upgraded on Bucklin Hill Road, Fredrickson Road NW adjacent to Pump Station 4 and on McConnel Ave NW and NW Carlton St about 1.4 miles away from Pump Station 4 in Old Town Silverdale (Schedule A and B). These upgrades will be subterranean in the rights-of-way. The conveyance upgrades are needed to address capacity issues in the system.

Description of construction activities (example: site preparation, demolition, excavation):

Schedules A and B

Construction activities will include site preparation, TESC installation, trench excavation to install the gravity sewers and force mains. Disturbed asphalt will be restored with hot mixed asphalt. An overlay of the entire westbound lane along NW Bucklin Road is anticipated. Installation of the force main along NW Bucklin Hill Road will disturb approximately 130 feet of sidewalk. The disturbed sidewalk will be restored with new cement concrete sidewalk. No sidewalks are anticipated to be disturbed within the Schedule B project area.

Schedules C

Construction activities will include site preparation, TESC installation, and temporary bypassing of sewage flows. Excavation up to 30 feet in depth will require temporary shoring and dewatering to facilitate the construction of a new reinforced concrete wet well and dry well. Construction activities will also involve trench excavation and backfill to install new gravity sewers, force main, stormwater conveyance improvements, a new water service line, and vent piping to route odorous air to a new biofiltration bed. A retaining wall will be constructed along the north and east sides of the project area to provide sufficient space for a new driveway that will provide access to the upgraded station. The existing sidewalk along NW Bucklin Hill Road from the existing access driveway to the station to Fredrickson Road will be replaced with a new ADA compliant sidewalk. The new driveway will be constructed of permeable interlocking concrete panels. Areas disturbed north and east of the retaining wall will be restored with hydroseeded grass.

Description of site drainage including flow from and onto adjacent properties. Must be consistent with Site Map in Appendix A:

Stormwater runoff from two lots north and northeast of the project site and about half of the lot directly north of the project site may enter the property. An existing storm water conveyance system along Richards Road NW intercepts flow from any further upstream tributary area and directs the runoff into the existing conveyance system along Bucklin Hill Road.

Runoff from the project site currently sheet flows into a ditch along the east side of Fredrickson Road which then conveys the runoff to the existing storm conveyance system within Bucklin Hill Road. Runoff from the site may also directly enter the storm conveyance system along Bucklin Hill Road.

The project will not alter or otherwise affect the current drainage patterns in the vicinity of the site. Runoff from the site will be collected in onsite catch basins and routed to the existing storm sewer system along NW Bucklin Hill Road or directed to the existing ditch along Fredrickson Road NW. Permeable interlocking concrete pavement (PICP) will be used for the access road

as a means of minimizing surface runoff. Roof drains will be connected to the onsite storm water conveyance piping which will then deliver the runoff to the conveyance system within Bucklin Hill Road.

While a Category I CARA is mapped in a segment of the project area near Pump Station 4, and a Category I CARA is mapped in McConnell Ave NW, the proposed improvements are not likely to result in adverse effects to groundwater due to existing developments and similar utility infrastructure on-site.

The project will comply with all Kitsap County stormwater management regulations and zoning rules related to impacts to environmentally sensitive areas, as applicable.

Description of final stabilization (example: extent of revegetation, paving, landscaping):

Disturbed areas north and east of the new retaining wall be restored with hydroseeded grass. The new driveway will consist of PICP with hot mixed asphalt aprons abutting Fredrickson Road NW and NW Bucklin Hill Road. The existing sidewalk along NW Bucklin Hill Road within the project area will be replaced with ADA compliant sidewalks, new concrete driveway entrances, and an ADA compliant pedestrian access ramp at the intersection of NW Bucklin Hill Road and Fredrickson Road NW.

Contaminated Site Information:

The consultant is unaware of any known or suspected contaminants on site.

Construction Stormwater Best Management Practices (BMPs) (2.0)

The SWPPP is a living document reflecting current conditions and changes throughout the life of the project. These changes may be informal (i.e. hand-written notes and deletions). Update the SWPPP when the CESCL has noted a deficiency in BMPs or deviation from original design.

The 12 Elements (2.1)

Element 1: Preserve Vegetation / Mark Clearing Limits (2.1.1)

To protect adjacent properties and to reduce the area of soil exposed to construction, the limits of construction will be clearly marked before land-disturbing activities begin. In general, natural vegetation and native topsoil shall be retained in an undisturbed state to the maximum extent possible. Trees shall be protected unless specifically indicated to be removed in the plans.

List and describe BMPs:

1. High Visibility Plastic or Metal Fence (BMP C103): A 3'0-tall minimum heavy plastic safety orange construction fence will be installed along the project clearing limits. Install based on the manufacturer's specifications.
2. Silt Fence (BMP C233): Install a silt fence along contour lines whenever possible. The silt fence shall have a 2' minimum height above the original ground surface. Drive the fence posts into the ground 12" minimum. Ideally, the post spacing is 6' maximum, but this can be increased to 8' if wire backing is used. Install the silt fence per the manufacturer's specifications.

Installation Schedules:

1. Install the fences before any land disturbing activity takes place.

Inspection and Maintenance plan:

2. Repair or replace the high visibility fence if it has been damaged or visibility is reduced.
3. Repair any damage to silt fence immediately. Replace filter fabric that deteriorates due to ultraviolet breakdown.
4. Check the uphill side of the silt fence for signs of clogging, which can lead to channelization of flow; replace the fence or removed sediment should clogging occur. Remove sediment deposits when the deposit reaches approximately one-third the height of the silt fence.

Responsible Staff: Contractor

Element 2: Establish Construction Access (2.1.2)

Construction access or activities occurring on unpaved areas shall be minimized, yet where necessary, access points will be stabilized to minimize the tracking of sediment onto public roads. The Pump Station 4 site will have one vehicle access route throughout the construction. Portions of construction exit may be paved with asphalt and drainage routed to a treatment system. Street sweeping and street cleaning shall be employed to prevent sediment from entering state waters or creating hazardous driving conditions. All wash water shall be controlled and treated on site.

List and describe BMPs:

1. Stabilized Construction Entrance/Exit (BMP C105): Construct a stabilized entrance where specified on the plans. This will limit the vehicle access to one route. The entrance will be at least 50'-long, with a 1' thick layer of 4" to 8" quarry spalls. The stabilized construction entrance shall have a full width of ingress/egress area (15' minimum).
2. Construction Road/ Parking Area Stabilization (BMP C107): Stabilizing roads where construction occurs reduces erosion caused by construction traffic or runoff.

Installation Schedules:

1. Construct the stabilized entrance and roads before any land construction or demolition activity happens.

Inspection and Maintenance plan:

2. Replace or clean quarry spalls if the entrance is not preventing sediment from being tracked onto pavement. Sweep the pavement by hand or with a high efficiency sweeper if there are any sediment that is tracked onto pavement. Do not use a non-high efficiency mechanical sweeper to prevent dust from being generated.

Responsible Staff: Contractor

Element 3: Control Flow Rates (2.1.3)

Will you construct stormwater retention and/or detention facilities?

Yes **No**

Will you use permanent infiltration ponds or other low impact development (example: rain gardens, bio-retention, porous pavement) to control flow during construction?

Yes **No**

In order to protect properties and waterways downstream of the project sites, storm water discharges from the sites will be controlled. Permanent detention or retention ponds were not specified on the plans or these sites due to limited space available for these types of facilities.

List and describe BMPs:

1. Wattles (BMP C235): Stake out fiber rolls (or silt dikes) with a diameter of 8' where specified on the plans. The wooden stake should be 1" x 2" x 18" and is driven through the middle of the wattle, leaving 4" protruding above the wattle.

Installation Schedules:

1. Install wattles before any demolition or construction takes place.

Inspection and Maintenance plan:

1. Ensure wattles are in contact with the soil and are thoroughly entrenched, especially after a rainfall. The wattles should be embedded 3" to 4".

Responsible Staff: Contractor

Element 4: Install Sediment Controls (2.1.4)

All storm water runoff from disturbed areas shall pass through an appropriate sediment removal BMP before leaving the construction site or prior to being discharged to an infiltration facility. These sediment control BMPs are installed before other land disturbing activities take place. They shall be placed appropriately to direct the stormwater.

List and describe BMPs:

1. Silt Fence (BMP C233): Install silt fence where specified on the plans. Silt fence shall have a 2' minimum height above the original ground surface. Drive the fence posts into the ground 12" minimum. Ideally, the post spacing is 6' maximum, but can be increased to 8' if wire backing is used. Install the silt fence per the manufacturer's specifications.
2. Storm Drain Inlet Protection (BMP C220): Install storm drain inlet protection where specified on the plans. Clean the surrounding area before installation.
3. Wattles (BMP C235): Stake out fiber rolls with a diameter of 8' where specified on the plans. The wooden stake should be 1" x 2" x 18" and is driven through the middle of the wattle, leaving 4" protruding above the wattle.

Installation Schedules:

1. Install the BMPs before any land disturbing activity takes place.

Inspection and Maintenance plan:

1. Check the uphill side of the fence for signs of clogging, which can lead to channelization of flow; replace the fence or removed sediment should clogging occur. Remove sediment deposits when the deposit reaches approximately one-third the height of the silt fence.
2. Sediment in the catch basin inserts shall be removed when the sediment has filled one-third of the available storage. The filter media for the insert shall be cleaned or replaced at least monthly.
3. Ensure that wattles are in contact with the soil and are thoroughly entrenched, especially after a rainfall. The wattles should be embedded 3" to 4". Repair any damage to the silt fence immediately.

Responsible Staff: Contractor

Element 5: Stabilize Soils (2.1.5)

Exposed and un-worked soils shall be stabilized with the application of effective BMPs to prevent erosion throughout the life of the project. The project sites are located west of the Cascade Mountain Crest. As such, no soils shall remain exposed and un-worked for more than 7 days during the dry season and 2 days during the wet season. The dates for the dry and wet season are shown below.

In general, cut and fill slopes will be stabilized as soon as possible, and soil stockpiles will be temporarily covered with plastic sheeting. All stockpiled soils shall be stabilized from erosion, protected with sediment trapping measures, and where possible, be located away from storm drain inlets, waterways, and drainage channels. Soil exposed during construction activity shall be minimized as possible.

West of the Cascade Mountains Crest

Season	Dates	Number of Days Soils Can be Left Exposed
During the Dry Season	May 1 – September 30	7 days
During the Wet Season	October 1 – April 30	2 days

Soils must be stabilized at the end of the shift before a holiday or weekend if needed based on the weather forecast.

Anticipated project dates: Start date: January 2023 End date: July 2024

Will you construct during the wet season?

Yes No

List and describe BMPs:

1. Temporary and Permanent Seeding (BMP C120): For Pump Station 4, seed all disturbed areas outside the fenced area with grass seed. The area within the fence will ultimately be graveled; if disturbed by construction, temporarily seed this area or provide rainfall protection.
2. Mulching (BMP C121): Mulch can be used for less than 30 days on disturbed areas that require cover. Mulch can also be used at all times for seeded areas. Maintain 2-inch minimum mulch thickness.
3. Plastic Covering (C123): Cover stockpiles with plastic. Ensure a minimum of 8-inch overlap at seams.

Installation Schedules:

1. Seeding takes place after demolition has started. Seed areas that will remain unworked for more than 30 days.
2. Mulching can take place at any time of the year. Installation takes place after construction activity has begun. Mulch disturbed areas.
3. Use plastic covering to cover stockpile before a precipitation event.

Inspection and Maintenance plan:

1. Reseed any seeded areas that fail to establish at least 80 percent cover (100 percent cover for areas that receive sheet or concentrated flows).
2. Maintain the thickness of the cover. Protect eroded areas by re-mulching.
3. Torn plastic sheets shall be replaced and open seams shall be repaired. Remove and replace plastic if it begins to deteriorate due to ultraviolet radiation.

Responsible Staff: Contractor

Element 6: Protect Slopes (2.1.6)

Protecting slopes is not applicable for this project because the project area does not have any steep slopes nor will any steep slopes adjacent to the project boundaries be disturbed.

Will steep slopes be present at the site during construction?

Yes **No**

List and describe BMPs: Not Applicable

Installation Schedules: Not Applicable

Inspection and Maintenance plan: Not Applicable

Responsible Staff: Not Applicable

Element 7: Protect Drain Inlets (2.1.7)

All storm drain inlets and culverts in operation during construction shall be protected to prevent unfiltered or untreated water from entering the drainage conveyance system. However, the first priority is to keep all access roads clean of sediment and keep street wash water separate from entering storm drains until treatment can be provided.

List and describe BMPs:

1. Storm Drain Inlet Protection (BMP C220): Install the storm drain inlet protection where specified on the plans. Clean the surrounding area before installation.

Installation Schedules:

1. Install storm drain inlet protection before any construction activity begins.

Inspection and Maintenance plan:

1. Any sediment in the catch basin insert shall be removed when the sediment has filled one-third of the available storage. Inspect the inlet weekly at a minimum and daily during storm events. The filter media for the insert shall be cleaned or replaced at least monthly.

Responsible Staff: Contractor

Element 8: Stabilize Channels and Outlets (2.1.8)

Provide stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent stream banks, slopes, and downstream reaches, will be installed at the outlets of all conveyance systems.

Stormwater runoff will sheet flow off the site and will not be concentrated into channels before it enters existing ditches. Silt dikes will be installed within the existing ditches to prevent sediments from being washed further downstream.

List and describe BMPs:

1. Triangular Silt Dike (BMP C208): The silt dike will be urethane foam sewn into a woven geosynthetic fabric. A 2’ minimum apron shall extend on either side of the triangular section. The staples used shall be No. 11 gauge wire, 8”-12” in length. They should be installed 3’ on center and where dike units overlap. The leading edge shall be secured with sandbags or keyed into native ground.

Installation Schedules:

1. Install the check dams/silt dikes before any land disturbing activity takes place.

Inspection and Maintenance plan:

1. Inspect for performance and sediment accumulation during and after each runoff producing rainfall. Remove the sediments when it reaches one half the height of the dam.
2. Anticipate submergence and deposits above the triangular silt dam and erosion from high flows around the edges of the dam. Immediately repair any damage or any undercutting of the dam.

Responsible Staff: Contractor

Element 9: Control Pollutants (2.1.9)

The following pollutants are anticipated to be present on-site:

Table 1 – Pollutants

Pollutant (and source, if applicable)
Concrete and cementitious particles
Diesel fuel for operating construction equipment

All pollutants, including waste materials and demolition debris, that occur onsite shall be handled and disposed of in a manner that does not cause contamination of storm water. Good housekeeping and preventative measures will be taken to ensure that the site will be kept clean, well-organized, and free of debris. Process water, such as wheel wash water and potentially contaminated water from asphalt surfaces will either be disposed of offsite or treated with settlement tanks. Necessary precautions will be taken to ensure pollutants are handled and disposed of in a safe manner. The contractor will be required to prepare a Spill Prevention, Control, and Countermeasure (SPCC) Plan under the Federal regulations of the Clean Water Act (CWA).

List and describe BMPs:

1. Sawcutting and Surfacing Pollution Prevention (BMP C152): Handle and dispose cleaning waste material and demolition debris in a manner that does not cause contamination of water.

Installation Schedules:

1. BMP C152 applies in the demolition of existing structures.

Inspection and Maintenance plan:

1. Monitor operations to determine whether slurry, cuttings, or process water could enter waters of the state. Stop operations and implement preventive measures should there be a violation of water quality standards.

Responsible Staff: Contractor

Will maintenance, fueling, and/or repair of heavy equipment and vehicles occur on-site?

Yes No

Contractor will need to fuel heavy equipment onsite and may be allowed to make minor repairs to equipment. Major repairs to equipment would be done offsite. The Contractor will prepare a SPCC that describes the measures that will be implemented to prevent spills and to address inadvertent spills.

List and describe BMPs:

1. Mobile Fueling of Vehicles and Heavy Equipment (S419): Ensure the point of fueling is at least 25 feet from the nearest storm sewer or inside an impervious containment with a volumetric capacity equal to or greater than 110 percent of the fueling tank volume, or covering the storm sewer to ensure no inflow of spilled or leaked fuel. Place a drip pan, or an absorbent pad under each fueling location prior to and during all dispensing operations.
2. Spills of Oil and Hazardous Substances (BMP S426): Maintain, update, and implement a Spill Prevention and Emergency Cleanup Plan. Train key personnel in the implementation of the SPECP.

Installation Schedules:

1. The BMP for mobile fueling should be applied whenever the equipment onsite is fueled.
2. The Spill Prevention and Emergency Cleanup Plan should be present from the beginning of construction through the end of construction.

Inspection and Maintenance plan:

1. Instruction and maintenance plan depends on the contractor's SPCC.

Responsible Staff: Contractor

Will wheel wash or tire bath system BMPs be used during construction?

Yes **No**

List and describe BMPs: Not applicable

Installation Schedules: Not Applicable

Inspection and Maintenance plan: Not Applicable

Responsible Staff: Not Applicable

Will pH-modifying sources be present on-site?

Yes No If yes, check the source(s).

Table 2 – pH-Modifying Sources

	None
	Bulk cement
	Cement kiln dust
	Fly ash
✓	Other cementitious materials
	New concrete washing or curing waters
✓	Waste streams generated from concrete grinding and sawing
	Exposed aggregate processes
✓	Dewatering concrete vaults
✓	Concrete pumping and mixer washout waters
✓	Recycled concrete
	Other (i.e. calcium lignosulfate) [please describe]

List and describe BMPs:

1. BMP C151: Concrete Handling: Ensure that washout of concrete trucks, chutes, pumps, and internals is performed at an approved off-site location. Do not allow washdown from areas such as concrete pavers in areas that directly drain directly to natural or constructed stormwater conveyances.
2. BMP C152: Sawcutting and Surfacing Pollution Prevention: Handle and dispose of cleaning waste material and demolition debris in a manner that does not cause contamination of water.

Installation Schedules:

1. BMP C151 applies when there is concrete work.
2. BMP C152 applies in the demolition of existing structures.

Inspection and Maintenance plan:

1. Check containers for holes in the liners daily during concrete pours and repair the same day.
2. Monitor operations to determine whether slurry, cuttings, or process water could enter waters of the state. Stop operations and implement preventive measures should there be a violation of water quality standards.

Responsible Staff: Contractor

Concrete trucks must not be washed out onto the ground, or into storm drains, open ditches, streets, or streams. Excess concrete must not be dumped on-site, except in designated concrete washout areas with appropriate BMPs installed.

Element 10: Control Dewatering (2.1.10)

All dewatering water from open cut excavation, tunneling, foundation work, trench, or underground vaults shall be pumped out and cleaned using methods such as a Baker tank. Discharged water shall be dispersed in a manner that does not cause erosion, flooding, or a violation of State water quality standards in receiving waters. BMPs that may be used for sediment trapping and turbidity reduction include:

Table 3 – Dewatering BMPs

✓	Infiltration
✓	Transport off-site in a vehicle (vacuum truck for legal disposal)
	Ecology-approved on-site chemical treatment or other suitable treatment technologies
	Sanitary or combined sewer discharge with local sewer district approval (last resort)
	Use of sedimentation bag with discharge to ditch or swale (small volumes of localized dewatering)

List and describe BMPs:

1. Dewatering effluent from open cut excavations, foundation work, and trenching will be routed to a Baker tank to allow sediments to settle before the water is released. The Contractor may use well points or deep wells to lower the water table prior to excavating. Effluent from the well points/deep wells while they are being established will be routed to a Baker tank before release. Once the well points/deep wells are established effluent may be discharged to the storm drainage system provided the effluent remains sediment free.
2. Transport off-site in a vehicle, such as a vacuum flush truck, for legal disposal in a manner that does not pollute state waters.
3. BMP C151: Concrete Handling: Ensure that washout of concrete trucks, chutes, pumps, and internals is performed at an approved off-site location. Do not allow washdown from areas such as concrete pavers in areas that directly drain directly to natural or constructed stormwater conveyances.

Installation Schedules:

1. BMP C151 applies when there is concrete work.

Inspection and Maintenance plan:

1. Check containers for holes in the liners daily during concrete pours and repair the same day.

Responsible Staff: Contractor

Element 11: Maintain BMPs (2.1.11)

All temporary and permanent Erosion and Sediment Control (ESC) BMPs shall be maintained and repaired as needed to ensure continued performance of their intended function.

Maintenance and repair shall be conducted in accordance with each particular BMP specification (see *Volume II of the SWMMWW or Chapter 7 of the SWMMEW*).

Visual monitoring of all BMPs installed at the site will be conducted at least once every calendar week and within 24 hours of any stormwater or non-stormwater discharge from the site. If the site becomes inactive and is temporarily stabilized, the inspection frequency may be reduced to once every calendar month.

All temporary ESC BMPs shall be removed within 30 days after final site stabilization is achieved or after the temporary BMPs are no longer needed.

Trapped sediment shall be stabilized on-site or removed. Disturbed soil resulting from removal of either BMPs or vegetation shall be permanently stabilized.

Additionally, protection must be provided for all BMPs installed for the permanent control of stormwater from sediment and compaction. BMPs that are to remain in place following completion of construction shall be examined and restored to full operating condition. If sediment enters these BMPs during construction, the sediment shall be removed, and the facility shall be returned to conditions specified in the construction documents.

Element 12: Manage the Project (2.1.12)

The project will be managed based on the following principles:

- Projects will be phased and broken into schedules (A-C) to the maximum extent practicable and seasonal work limitations will be considered.
- Inspection and monitoring:
    - Inspection, maintenance, and repair of all BMPs will occur as needed to ensure performance of their intended function.
    - Site inspections and monitoring will be conducted in accordance with Special Condition S4 of the CSWGP. Sampling station(s) shall be located in accordance with applicable requirements of the CSWGP.
- Maintain an updated SWPPP.
    - The SWPPP will be updated, maintained, and implemented in accordance with Special Conditions S3, S4, and S9 of the CSWGP.

As site work progresses, the SWPPP will be modified to reflect changing site conditions. The SWPPP will be reviewed at least monthly by the Contractor to ensure the content is current.

Table 4 – Management

✓	Design the project to fit the existing topography, soils, and drainage patterns
✓	Emphasize erosion control rather than sediment control
✓	Minimize the extent and duration of the area exposed
✓	Keep runoff velocities low
✓	Retain sediment on-site
✓	Thoroughly monitor site and maintain all ESC measures
✓	Schedule major earthwork during the dry season
	Other (please describe)

Table 5 – BMP Implementation Schedule (to be developed by the Contractor)

Phase of Construction Project	Stormwater BMPs	Date	Wet/Dry Season
Estimate of Construction start date:	N/A	TBD	Wet and Dry
Install ESC measures:	C103, C233, C235, C220, C105, C208	TBD	
Mobilize equipment on site:	S426	TBD	
Mobilize and store ESC and soil stabilization products (store materials on hand BMP C150):	C123	TBD	
Begin clearing and grubbing:		TBD	
Construction of sewer facilities:	C152, C151	TBD	
Final paving and re-surfacing:	C120, C121	TBD	
Estimate of Construction finish date:	N/A	TBD	

Element 13: Protect Low Impact Development (LID) BMPs (2.1.13)

Low Impact Development (LID) BMPs are stormwater management practices used to mimic an existing site's natural hydrologic response to precipitation. Some of the common LID BMPs include bioretention/rain gardens and permeable pavements. In general, these facilities must be protected from sedimentation by installing and maintaining erosion and sediment control BMPs. These facilities must also be protected from compaction from construction equipment and foot traffic to maintain their infiltration capacities.

One of the sites, uses BMP C208 or Triangular Silt Dike to prevent sediments from being transported downstream within the ditch. Sediment shall be removed when it reaches half the height of the dam. The site also uses a permeable pavement system, which specifies an uncompacted subgrade soil. All the components of the permeable pavement system will be installed one area at a time to prevent heavy machinery from compacting the soil. Excavation required to establish the grades for the base and sub base will not occur until all non-restoration associated work is complete.

Pollution Prevention Team (3.0)

Table 6 – Team Information

Title	Name(s)	Phone Number
Certified Erosion and Sediment Control Lead (CESCL)	Contractor (Name To Be Determined)	To Be Determined
Resident Engineer		
Emergency Ecology Contact		
Emergency Permittee/ Owner Contact	Nick Martin	(360) 271-1427
Non-Emergency Owner Contact	Nick Martin	(360) 271-1427
Monitoring Personnel	On Duty Contact	(425) 649-7000
Ecology Regional Office	Northwest Regional Office	(425)-649-7000

Monitoring and Sampling Requirements (4.0)

Monitoring includes visual inspection, sampling for water quality parameters of concern, and documentation of the inspection and sampling findings in a site logbook. A site logbook will be maintained for all on-site construction activities and will include:

- A record of the implementation of the SWPPP and other permit requirements
- Site inspections
- Stormwater sampling data

The site logbook must be maintained on-site within reasonable access to the site and be made available upon request to Ecology or the local jurisdiction. Appendix C contains the latest Inspection form found on Ecology website.

Numeric effluent limits may be required for certain discharges to 303(d) listed waterbodies. See CSWGP Special Condition S8 and Section 5 of this template.

Complete the following paragraph for sites that discharge to impaired waterbodies for fine sediment, turbidity, phosphorus, or pH:

Site Inspection (4.1)

Site inspections will be conducted at least once every calendar week and within 24 hours following any discharge from the site. For sites that are temporarily stabilized and inactive, the required frequency is reduced to once per calendar month.

The discharge point(s) are indicated on the Site Map (see Appendix A) and in accordance with the applicable requirements of the CSWGP.

Stormwater Quality Sampling (4.2)

Turbidity Sampling (4.2.1)

Requirements include calibrated turbidity meter or transparency tube to sample site discharges for compliance with the CSWGP. Sampling will be conducted at all discharge points at least once per calendar week.

Method for sampling turbidity:

Table 7 – Turbidity Sampling Method

	Turbidity Meter/Turbidimeter (required for disturbances of 5 acres or greater in size)
✓	Transparency Tube (option for disturbances less than 1 acre and up to 5 acres in size)

The benchmark for turbidity value is 25 nephelometric turbidity units (NTU) and a transparency less than 33 centimeters.

If the discharge's turbidity is 26 to 249 NTU **or** the transparency is less than 33 cm but equal to or greater than 6 cm, the following steps will be conducted:

1. Review the SWPPP for compliance with Special Condition S9. Make appropriate revisions within 7 days of the date the discharge exceeded the benchmark.

2. Immediately begin the process to fully implement and maintain appropriate source control and/or treatment BMPs as soon as possible. Address the problems within 10 days of the date the discharge exceeded the benchmark. If installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when the Permittee requests an extension within the initial 10-day response period.
3. Document BMP implementation and maintenance in the site logbook.

If the turbidity exceeds 250 NTU **or** the transparency is 6 cm or less at any time, the following steps will be conducted:

1. Telephone or submit an electronic report to the applicable Ecology Region's Environmental Report Tracking System (ERTS) within 24 hours. https://www.ecology.wa.gov/About-us/Get-involved/Report-an-environmental-issue
    - Central Region (Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, Yakima): (509) 575-2490
    - Eastern Region (Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman): (509) 329-3400
    - Northwest Region (King, Kitsap, Island, San Juan, Skagit, Snohomish, Whatcom): (425) 649-7000
    - Southwest Region (Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Lewis, Mason, Pacific, Pierce, Skamania, Thurston, Wahkiakum,): (360) 407-6300
2. Immediately begin the process to fully implement and maintain appropriate source control and/or treatment BMPs as soon as possible. Address the problems within 10 days of the date the discharge exceeded the benchmark. If installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when the Permittee requests an extension within the initial 10-day response period
3. Document BMP implementation and maintenance in the site logbook.
4. Continue to sample discharges daily until one of the following is true:
    - Turbidity is 25 NTU (or lower).
    - Transparency is 33 cm (or greater).
    - Compliance with the water quality limit for turbidity is achieved.
        - 1 - 5 NTU over background turbidity, if background is less than 50 NTU
        - 1% - 10% over background turbidity, if background is 50 NTU or greater
    - The discharge stops or is eliminated.

pH Sampling (4.2.2)

Monitoring pH is required for "Significant concrete work" (i.e. greater than 1,000 cubic yards poured concrete or recycled concrete over the life of the project).The use of engineered soils (soil amendments including but not limited to Portland cement-treated base [CTB], cement kiln dust [CKD] or fly ash) also requires pH monitoring.

For significant concrete work, pH sampling will start the first day concrete is poured and continue until it is cured, typically three (3) weeks after the last pour.

For engineered soils and recycled concrete, pH sampling begins when engineered soils or recycled concrete are first exposed to precipitation and continues until the area is fully stabilized.

If the measured pH is 8.5 or greater, the following measures will be taken:

1. Prevent high pH water from entering storm sewer systems or surface water.

2. Adjust or neutralize the high pH water to the range of 6.5 to 8.5 su using appropriate technology such as carbon dioxide (CO_2) sparging (liquid or dry ice).
3. Written approval will be obtained from Ecology prior to the use of chemical treatment other than CO_2 sparging or dry ice.

Method for sampling pH:

Check the analysis method you will use:

Table 8 – pH Sampling Method

	pH meter
	pH test kit
	Wide range pH indicator paper

Discharges to 303(d) or Total Maximum Daily Load (TMDL) Waterbodies (5.0)

303(d) Listed Waterbodies (5.1)

Is the receiving water 303(d) (Category 5) listed for turbidity, fine sediment, phosphorus, or pH?

Yes **No**

Runoff from the Pump Station 4 site and the conveyance upgrades does not discharge to a 303(d) waterbody listed for turbidity, fine sediment, phosphorus, or pH.

List and describe BMPs: Not Applicable

TMDL Waterbodies (5.2)

Waste Load Allocation for CWSGP discharges:

The Pump Station 4 site is bound bounded to the west by a ditch along the eastern edge of Fredrickson Road NW and by an existing storm water conveyance system to the south within NW Bucklin Hill Road. A ditch along eastern edge of Richardson Road NW defines the eastern boundary. Contours limit runoff entering the site to the north. The upstream tributary runoff is sheet flow onto the project site that will continue as sheet flow across the site until it enters the proposed onsite storm collection system, the existing drainage ditch along the east side of Fredrickson Road NW, or into the existing stormwater conveyance system within NW Bucklin Hill Road. Existing storm water conveyance systems control surface runoff along NW Carlton Road and McConnel Road NW. Construction activities will have negligible impact to the TMDL at those inlets.

List and describe BMPs:

1. Not Applicable

Discharges to TMDL receiving waterbodies will meet in-stream water quality criteria at the point of discharge.

Reporting and Record Keeping (6.0)

Record Keeping (6.1)

Site Logbook (6.1.1)

A site logbook will be maintained for all on-site construction activities and will include:

- A record of the implementation of the SWPPP and other permit requirements
- Site inspections
- Sample logs

Records Retention (6.1.2)

Records will be retained during the life of the project and for a minimum of three (3) years following the termination of permit coverage in accordance with Special Condition S5.C of the CSWGP.

Permit documentation to be retained on-site:

- CSWGP
- Permit Coverage Letter
- SWPPP
- Site Logbook

Permit documentation will be provided within 14 days of receipt of a written request from Ecology. A copy of the SWPPP or access to the SWPPP will be provided to the public when requested in writing in accordance with Special Condition S5.G.2.b of the CSWGP.

Updating the SWPPP (6.1.3)

The SWPPP will be modified if:

- Found ineffective in eliminating or significantly minimizing pollutants in stormwater discharges from the site.
- There is a change in design, construction, operation, or maintenance at the construction site that has, or could have, a significant effect on the discharge of pollutants to waters of the State.

The SWPPP will be modified within seven (7) days if inspection(s) or investigation(s) determine additional or modified BMPs are necessary for compliance. An updated timeline for BMP implementation will be prepared.

Reporting (6.2)

Discharge Monitoring Reports (6.2.1)

Cumulative soil disturbance is less than one (1) acre; therefore, Discharge Monitoring Reports (DMRs) will not be submitted to Ecology because water quality sampling is not being conducted at the site.

Notification of Noncompliance (6.2.2)

If any of the terms and conditions of the permit is not met, and the resulting noncompliance may cause a threat to human health or the environment, the following actions will be taken:

1. Ecology will be notified within 24-hours of the failure to comply by calling the applicable Regional Office ERTS phone number (Regional office numbers listed below).
2. Immediate action will be taken to prevent the discharge/pollution or otherwise stop or correct the noncompliance. If applicable, sampling and analysis of any noncompliance will be repeated immediately, and the results submitted to Ecology within five (5) days of becoming aware of the violation.
3. A detailed written report describing the noncompliance will be submitted to Ecology within five (5) days, unless requested earlier by Ecology.

Specific information to be included in the noncompliance report is found in Special Condition S5.F.3 of the CSWGP.

Anytime turbidity sampling indicates turbidity is 250 NTUs or greater, or water transparency is 6 cm or less, the Ecology Regional office will be notified by phone within 24 hours of analysis as required by Special Condition S5.A of the CSWGP. Contact information for each regional office can be found in section 4.2 Stormwater Quality Sampling and Turbidity Sampling (4.2.1).

Include the following information:

1. Your name and Phone number
2. Permit number
3. City / County of project
4. Sample results
5. Date / Time of call
6. Date / Time of sample
7. Project name

In accordance with Special Condition S4.D.5.b of the CSWGP, the Ecology Regional office will be notified if chemical treatment other than CO_2 sparging is planned for adjustment of high pH water.

Appendix A - Site Map

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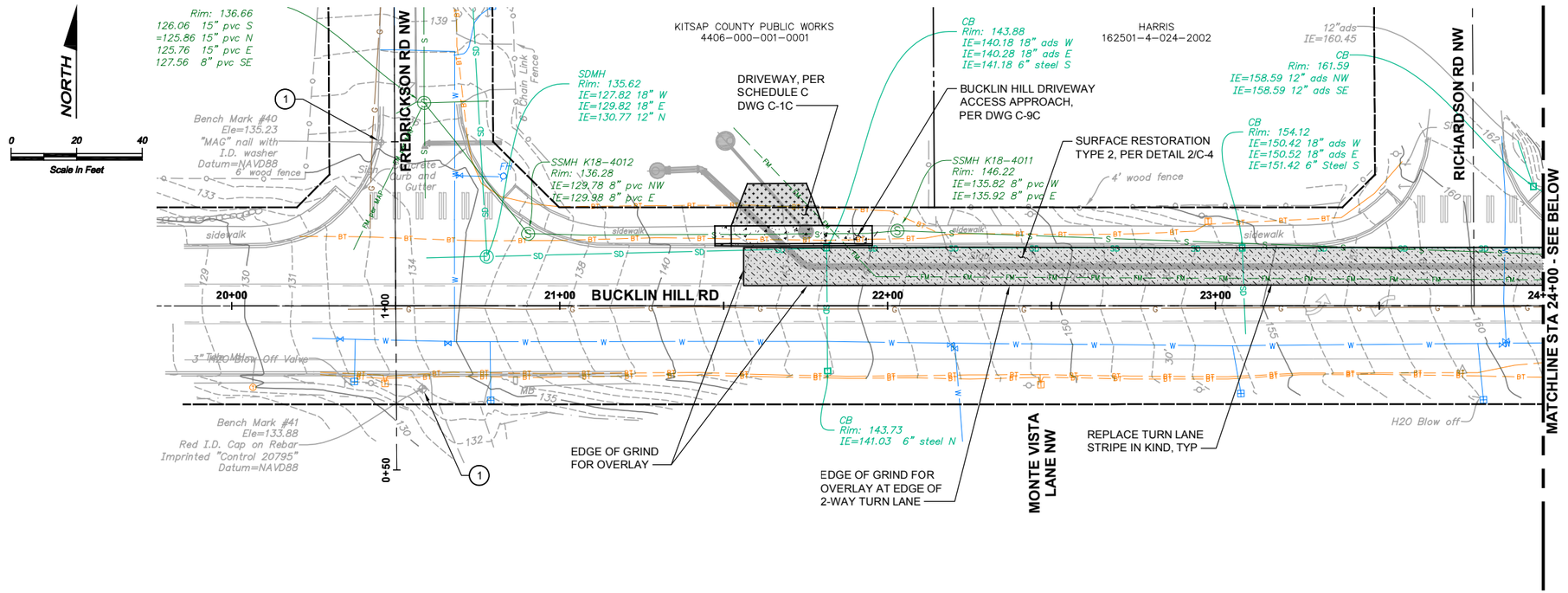

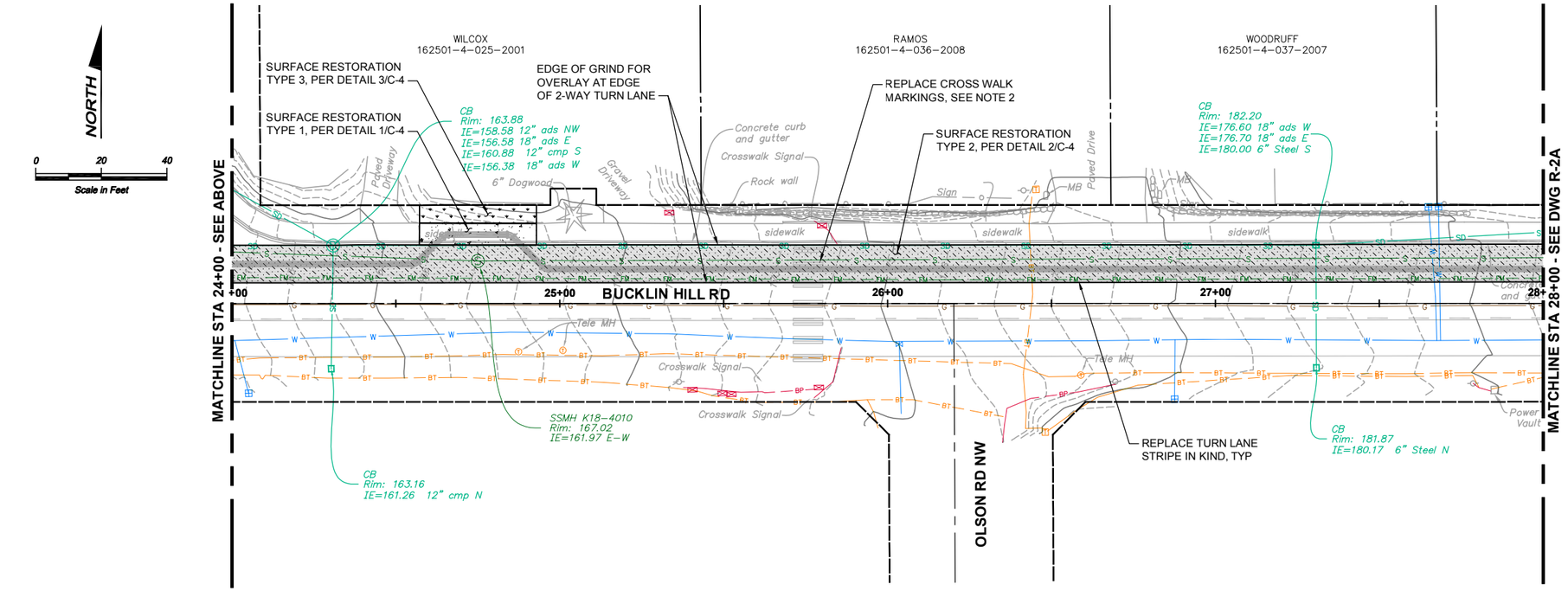

NOTES:

1. OVERLAY SHALL OCCUPY THE ENTIRE WIDTH OF THE WESTBOUND LANE.
2. REFERENCE STREET CENTERLINE STRIPING, STOP BARS, CROSS WALK STRIPING, AND OTHER SURFACE STREET MARKING PRIOR TO DISTURBING EXISTING AC PAVEMENT. RESTORE ALL MARKINGS IN KIND TO ORIGINAL LOCATIONS AFTER COMPLETION OF FINAL RESTORATION.

CONSTRUCTION NOTES:

(1) PROTECT BENCHMARK/SURVEY MONUMENT. IF THE BENCHMARK/MONUMENT MUST BE DISTURBED, WORK SHALL COMPLY WITH SECTION1-05.4 OF THE SPECIAL PROVISIONS AND THE WASHINGTON STATE DNR PERMIT TO DESTROY OR REMOVE A SURVEY MONUMENT.

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Designed: T. Fisher, P.E.
Drawn: A. Cariaso
Checked: R. Dorn, P.E.

Scale: 1" = 20'-0"
One Inch at Full Scale
If Not One Inch Scale Accordingly

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614 Division Street, MS 26
Port Orchard, WA 98366

SILVERDALE CONVEYANCE SYSTEM AND PUMP STATION 4 UPGRADES
SCHEDULE A
BUCKLIN HILL RD RESTORATION PLAN STA 21+00 TO STA 28+00

Drawing: R-1A
Sheet: 22 of 117
File: P21-10530_R-1A-2A
Date: November 2022

Path: S:\Cad\Kitsap County\21-10530 Silverdale Convey-PS 4 Upgr\Design\d Filename: P21-10530_R-1A-2A Plot date: Nov 08, 2022-08:17:35am CAD User: psimon.
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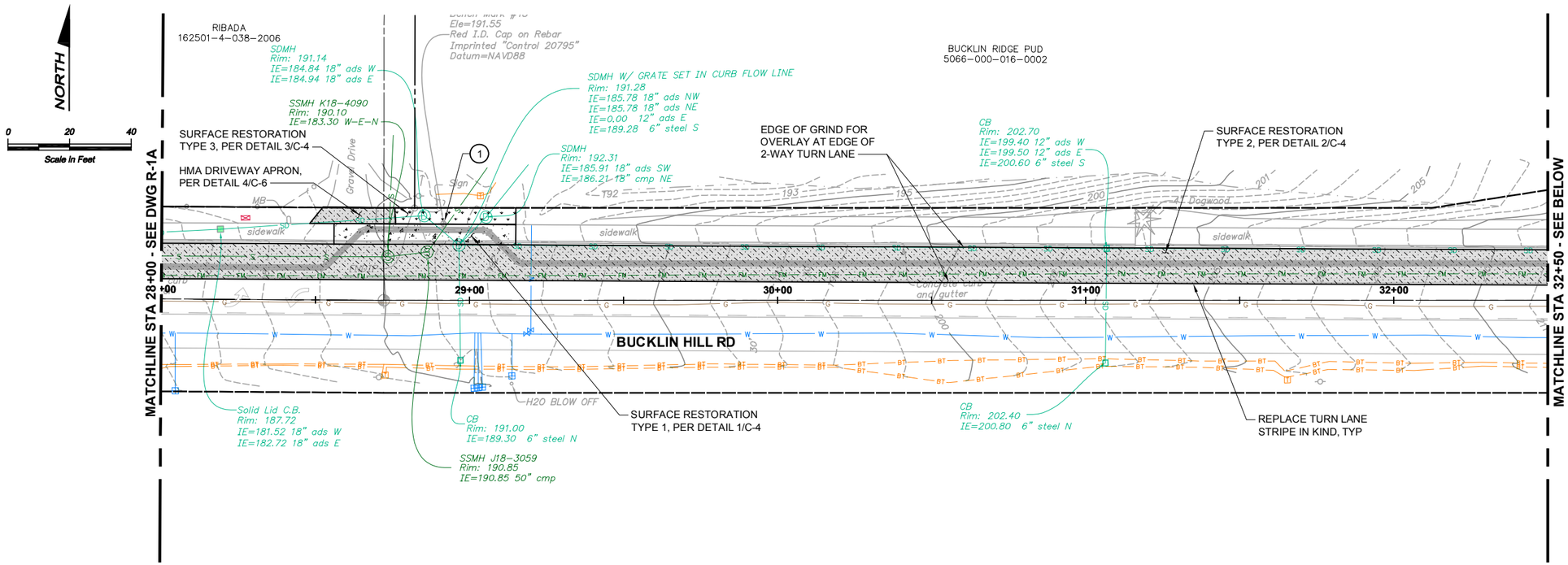

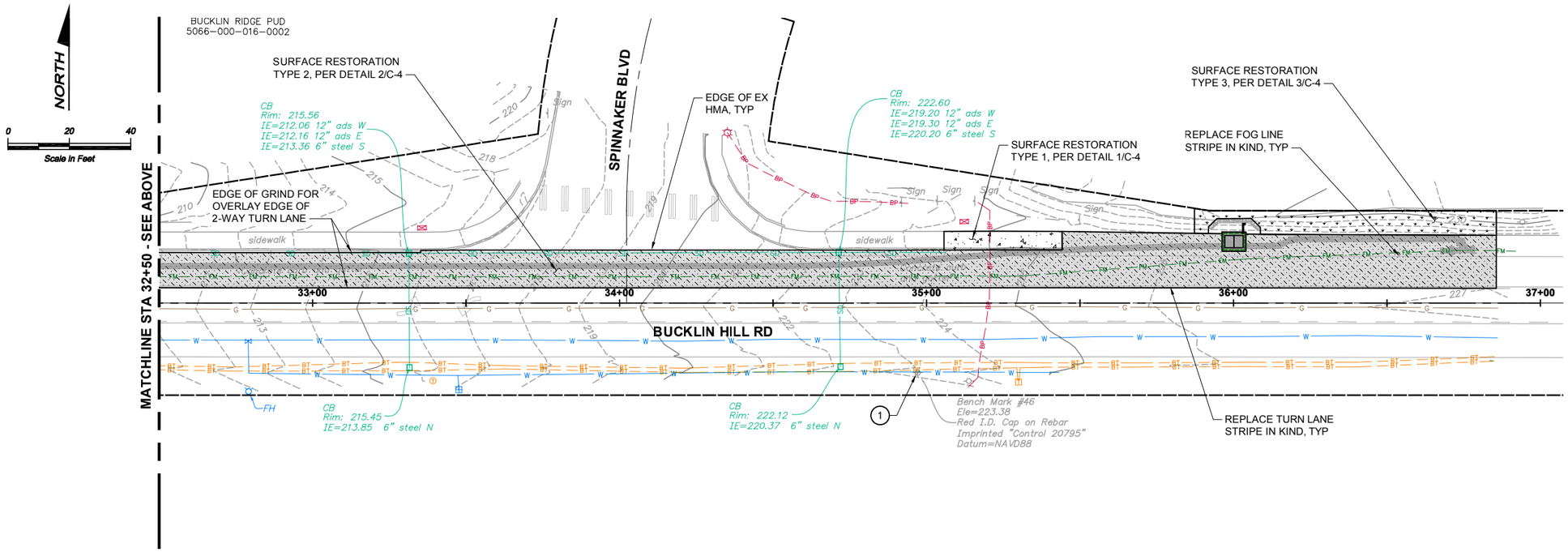

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Drawn: A. Cariaso
Checked: R. Dorn, P.E.

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If Not One Inch Scale Accordingly

Kitsap County Public Works
614 Division Street, MS 26
Port Orchard, WA 98366

SILVERDALE CONVEYANCE SYSTEM AND PUMP STATION 4 UPGRADES
SCHEDULE A

BUCKLIN HILL RD RESTORATION PLAN STA 28+00 TO STA 37+00

Drawing: R-2A
Sheet: 23 of 117
File: P21-10530_R-1B-2B
Date: November 2022

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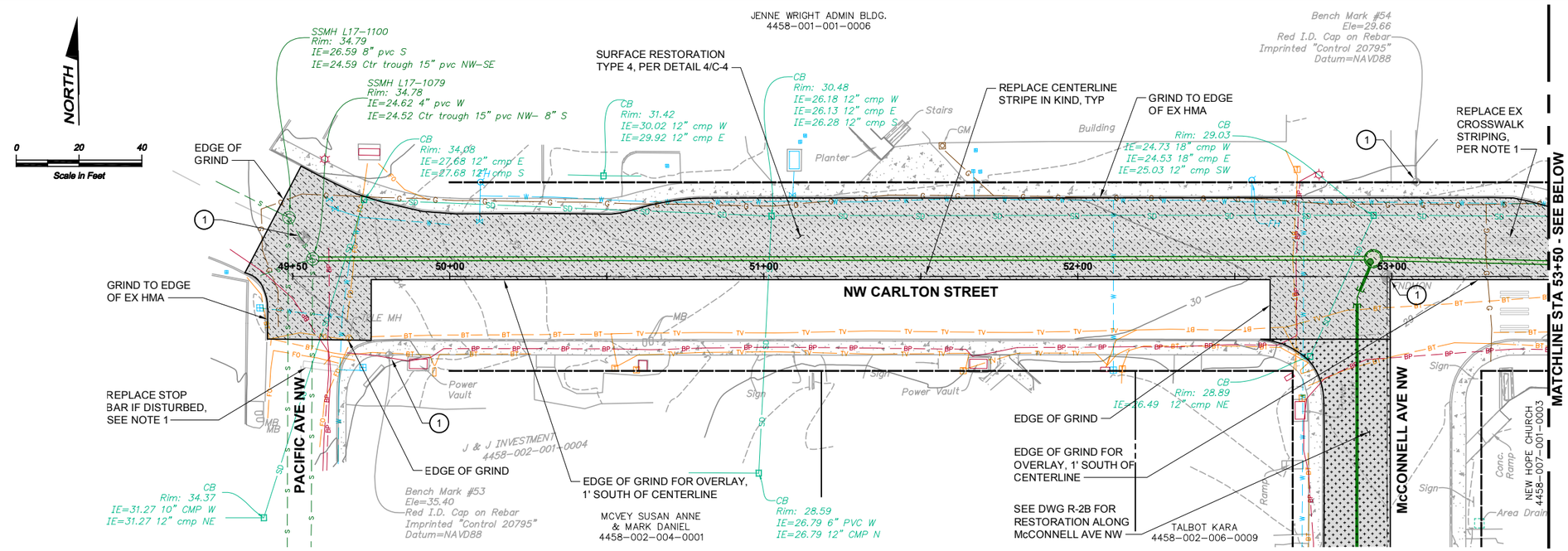

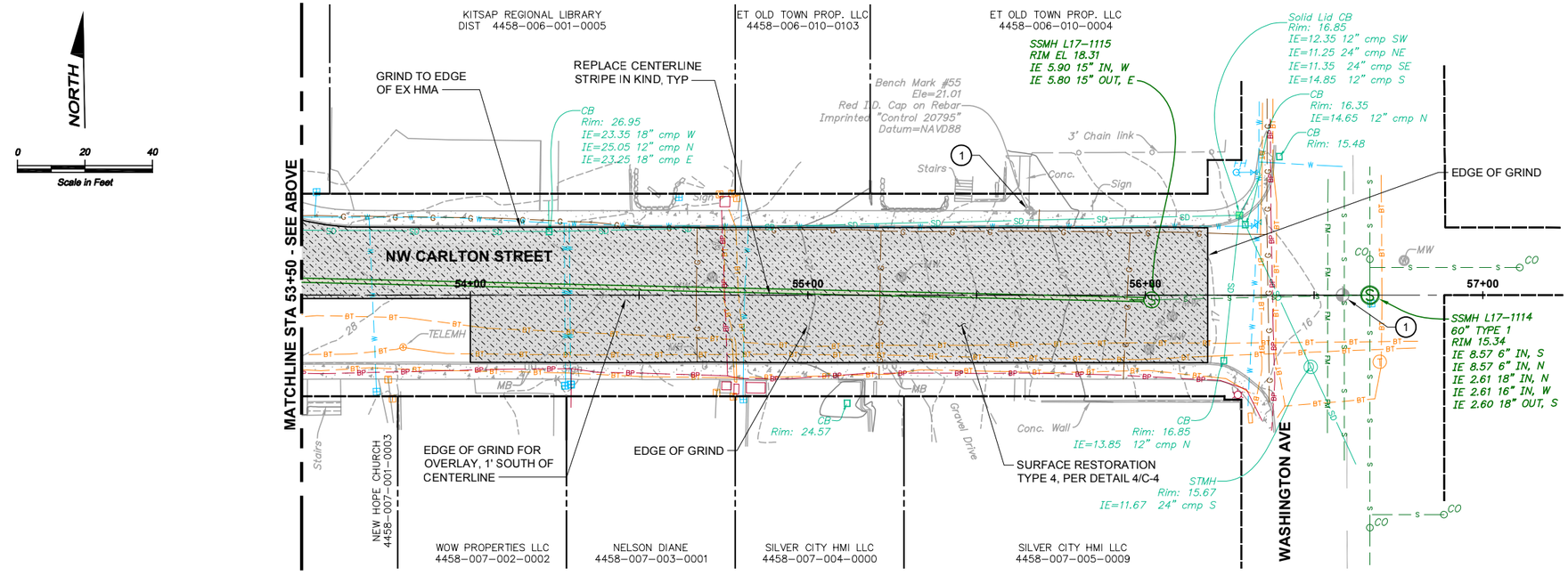

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Checked: R. Dorn, P.E.

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SILVERDALE CONVEYANCE SYSTEM AND PUMP STATION 4 UPGRADES
SCHEDULE B
NW CARLTON STREET RESTORATION PLAN
STA 49+50 TO STA 56+50

Drawing: R-1B
Sheet: 32 of 117
File: P21-10530_R-1B-2B
Date: November 2022

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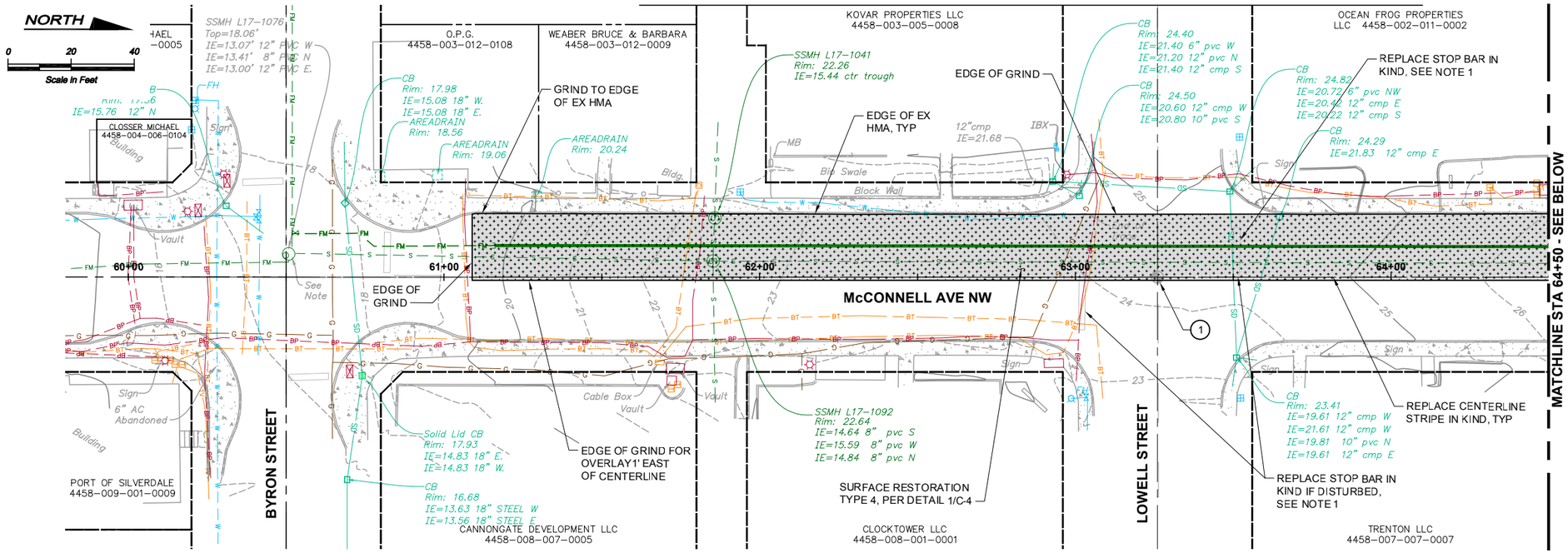

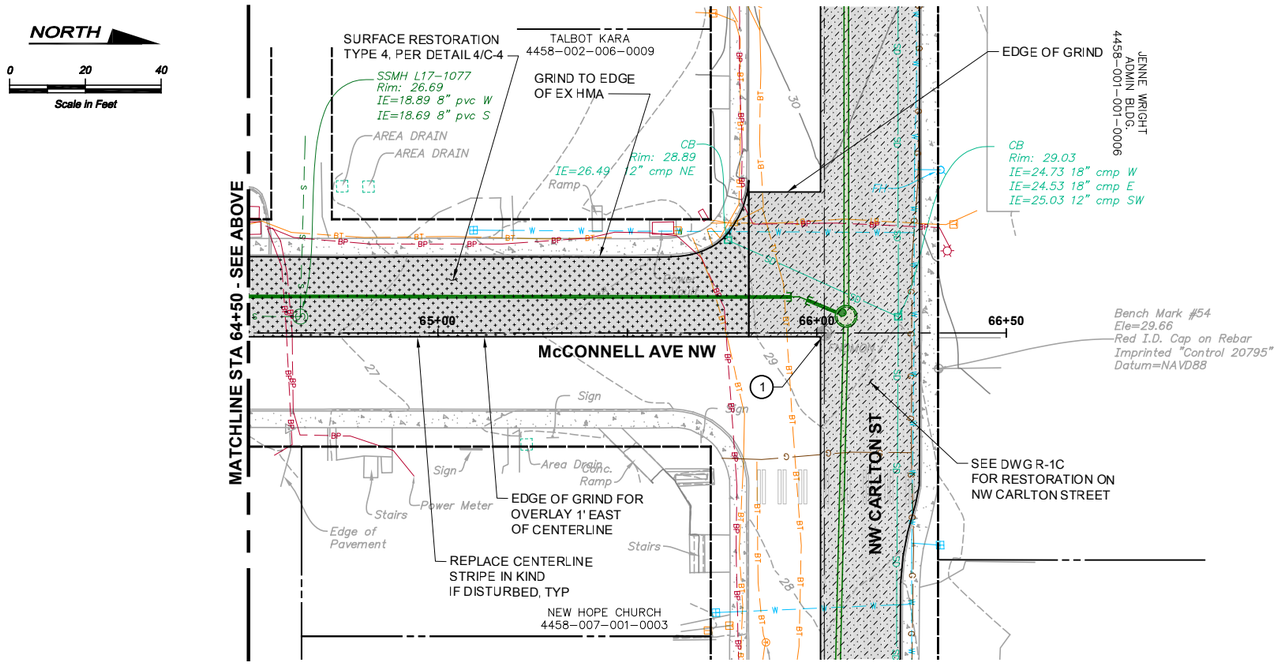

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Checked: R. Dorn, P.E.

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One Inch at Full Scale
If Not One Inch Scale Accordingly

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Port Orchard, WA 98366

SILVERDALE CONVEYANCE SYSTEM AND PUMP STATION 4 UPGRADES
SCHEDULE B
McCONNELL AVE NW
RESTORATION PLAN
STA 60+00 TO STA 66+00

Drawing: R-2B
Sheet: 33 of 117
File: P21-10530_R-1C-2C
Date: November 2022

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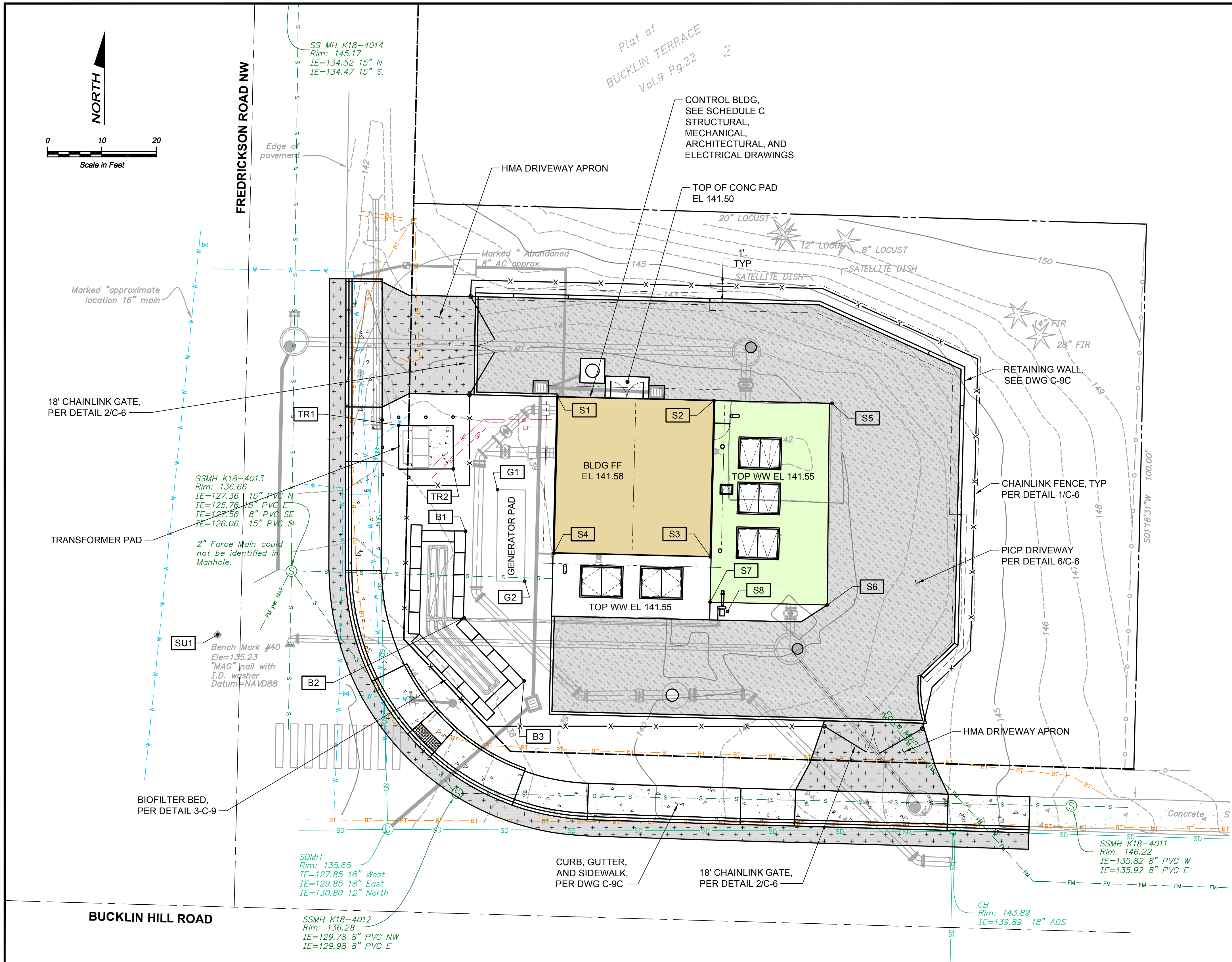

NOTES:

1. SEE DRAWING C-8C FOR GRADING AND DRAINAGE PLAN AND C-9C FOR RETAINING WALL AND SIDEWALK PLAN.

COORDINATE CONTROL NOTES:

1. SEE DWGS D-1C, C-2C, C-8C AND C-9C FOR ADDITIONAL COORDINATE POINTS.

STRUCTURE ELEVATION - COORDINATE CONTROL

PT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
S1	242796.53	1186611.40	141.08	GROUND AT BUILDING CORNER
S2	242795.84	1186640.06	141.28	GROUND AT BUILDING CORNER
S3	242767.18	1186639.37	141.55	BUILDING CORNER AT EX WET WELL
S4	242767.88	1186610.71	141.55	BUILDING CORNER AT EX WET WELL
S5	242795.32	1186661.72	141.43	GROUND AT WET WELL CORNER
S6	242758.33	1186660.83	141.10	GROUND AT WET WELL CORNER
S7	242758.85	1186639.36	141.55	WET WELL CORNER
S8	242757.30	1186641.30	141.55	TOP OF BIOFILTER FAN SLAB
SU1	242752.87	1186549.02	135.23	BENCH MARK #1
G1	242779.49	1186600.33	140.70	TOP OF GENERATOR PAD
G2	242762.68	1186605.33	140.70	TOP OF GENERATOR PAD
TR1	242791.26	1186582.21	140.20	TOP OF TRANSFORMER PAD
TR2	242783.29	1186592.24	140.20	TOP OF TRANSFORMER PAD
B1	242771.88	1186594.49		BIOFILTER BED WALL
B2	242756.00	1186594.22		BIOFILTER BED WALL
B3	242744.41	1186605.25		BIOFILTER BED WALL

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SILVERDALE CONVEYANCE SYSTEM AND PUMP STATION 4 UPGRADES
SCHEDULE C

SITE PLAN

Drawing: **C-1C**
Sheet: 39 of 117
File: P21-10530_C-1C
Date: November 2022

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Xref Filename: | Fisher | X21-10530_TB | X21-10530_Status | X21-10530-PS4_Ex Topo | X21-10530-PS4_Prop Site | X21-10530-PS4_Prop HMA | X21-10530-SCU_Ex Topo | Palmatier | Dahl |

Appendix B - BMP Details

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BMP C103: High Visibility Fence

Purpose

Fencing is intended to:

1. Restrict clearing to approved limits.
2. Prevent disturbance of sensitive areas, their buffers, and other areas required to be left undisturbed.
3. Limit construction traffic to designated construction entrances, exits, or internal roads.
4. Protect areas where marking with survey tape may not provide adequate protection.

Conditions of Use

To establish clearing limits plastic, fabric, or metal fence may be used:

- At the boundary of sensitive areas, their buffers, and other areas required to be left uncleared.
- As necessary to control vehicle access to and on the site.

Design and Installation Specifications

High visibility plastic fence shall be composed of a high-density polyethylene material and shall be at least four feet in height. Posts for the fencing shall be steel or wood and placed every 6 feet on center (maximum) or as needed to ensure rigidity. The fencing shall be fastened to the post every six inches with a polyethylene tie. On long continuous lengths of fencing, a tension wire or rope shall be used as a top stringer to prevent sagging between posts. The fence color shall be high visibility orange. The fence tensile strength shall be 360 lbs./ft. using the ASTM D4595 testing method.

If appropriate install fabric silt fence in accordance with BMP C233 to act as high visibility fence. Silt fence shall be at least 3 feet high and must be highly visible to meet the requirements of this BMP.

Metal fences shall be designed and installed according to the manufacturer's specifications.

Metal fences shall be at least 3 feet high and must be highly visible.

Fences shall not be wired or stapled to trees.

Maintenance Standards

If the fence has been damaged or visibility reduced, it shall be repaired or replaced immediately and visibility restored.

BMP C105: Stabilized Construction Entrance / Exit

Purpose

Stabilized Construction entrances are established to reduce the amount of sediment transported onto paved roads by vehicles or equipment. This is done by constructing a stabilized pad of quarry spalls at entrances and exits for construction sites.

Conditions of Use

Construction entrances shall be stabilized wherever traffic will be entering or leaving a construction site if paved roads or other paved areas are within 1,000 feet of the site.

For residential construction provide stabilized construction entrances for each residence, rather than only at the main subdivision entrance. Stabilized surfaces shall be of sufficient length/width to provide vehicle access/parking, based on lot size/configuration.

On large commercial, highway, and road projects, the designer should include enough extra materials in the contract to allow for additional stabilized entrances not shown in the initial Construction SWPPP. It is difficult to determine exactly where access to these projects will take place; additional materials will enable the contractor to install them where needed.

Design and Installation Specifications

See Figure 4.1.1 for details. Note: the 100' minimum length of the entrance shall be reduced to the maximum practicable size when the size or configuration of the site does not allow the full length (100').

Construct stabilized construction entrances with a 12-inch thick pad of 4-inch to 8-inch quarry spalls, a 4-inch course of asphalt treated base (ATB), or use existing pavement. Do not use crushed concrete, cement, or calcium chloride for construction entrance stabilization because these products raise pH levels in stormwater and concrete discharge to surface waters of the State is prohibited.

A separation geotextile shall be placed under the spalls to prevent fine sediment from pumping up into the rock pad. The geotextile shall meet the following standards:

Grab Tensile Strength (ASTM D4751)	200 psi min.
Grab Tensile Elongation (ASTM D4632)	30% max.
Mullen Burst Strength (ASTM D3786-80a)	400 psi min.
AOS (ASTM D4751)	20-45 (U.S. standard sieve size)

- Consider early installation of the first lift of asphalt in areas that will paved; this can be used as a stabilized entrance. Also consider the installation of excess concrete as a stabilized entrance. During large concrete pours, excess concrete is often available for this purpose.

- Fencing (see BMP C103) shall be installed as necessary to restrict traffic to the construction entrance.
- Whenever possible, the entrance shall be constructed on a firm, compacted subgrade. This can substantially increase the effectiveness of the pad and reduce the need for maintenance.
- Construction entrances should avoid crossing existing sidewalks and back of walk drains if at all possible. If a construction entrance must cross a sidewalk or back of walk drain, the full length of the sidewalk and back of walk drain must be covered and protected from sediment leaving the site.

Maintenance Standards

Quarry spalls shall be added if the pad is no longer in accordance with the specifications.

- If the entrance is not preventing sediment from being tracked onto pavement, then alternative measures to keep the streets free of sediment shall be used. This may include replacement/cleaning of the existing quarry spalls, street sweeping, an increase in the dimensions of the entrance, or the installation of a wheel wash.
- Any sediment that is tracked onto pavement shall be removed by shoveling or street sweeping. The sediment collected by sweeping shall be removed or stabilized on site. The pavement shall not be cleaned by washing down the street, except when high efficiency sweeping is ineffective and there is a threat to public safety. If it is necessary to wash the streets, the construction of a small sump to contain the wash water shall be considered. The sediment would then be washed into the sump where it can be controlled.
- Perform street sweeping by hand or with a high efficiency sweeper. Do not use a non-high efficiency mechanical sweeper because this creates dust and throws soils into storm systems or conveyance ditches.
- Any quarry spalls that are loosened from the pad, which end up on the roadway shall be removed immediately.
- If vehicles are entering or exiting the site at points other than the construction entrance(s), fencing (see BMP C103) shall be installed to control traffic.
- Upon project completion and site stabilization, all construction accesses intended as permanent access for maintenance shall be permanently stabilized.

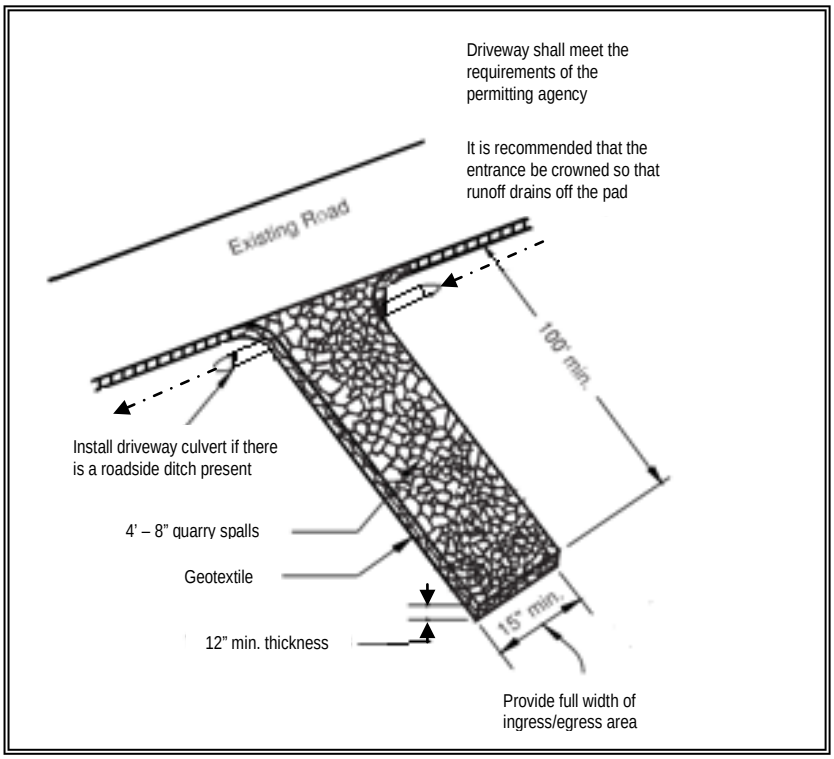


Figure 4.1.1 – Stabilized Construction Entrance

Approved as Equivalent

Ecology has approved products as able to meet the requirements of BMP C105. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept this product approved as equivalent, or may require additional testing prior to consideration for local use. The products are available for review on Ecology's website at http://www.ecy.wa.gov/programs/wq/stormwater/newtech/equivalent.html

BMP C120: Temporary and Permanent Seeding

Purpose

Seeding reduces erosion by stabilizing exposed soils. A well-established vegetative cover is one of the most effective methods of reducing erosion.

Conditions of Use

Use seeding throughout the project on disturbed areas that have reached final grade or that will remain unworked for more than 30 days.

The optimum seeding windows for western Washington are April 1 through June 30 and September 1 through October 1.

Between July 1 and August 30 seeding requires irrigation until 75 percent grass cover is established.

Between October 1 and March 30 seeding requires a cover of mulch with straw or an erosion control blanket until 75 percent grass cover is established.

Review all disturbed areas in late August to early September and complete all seeding by the end of September. Otherwise, vegetation will not establish itself enough to provide more than average protection.

- Mulch is required at all times for seeding because it protects seeds from heat, moisture loss, and transport due to runoff. Mulch can be applied on top of the seed or simultaneously by hydroseeding. See BMP C121: Mulching for specifications.
- Seed and mulch, all disturbed areas not otherwise vegetated at final site stabilization. Final stabilization means the completion of all soil disturbing activities at the site and the establishment of a permanent vegetative cover, or equivalent permanent stabilization measures (such as pavement, riprap, gabions, or geotextiles) which will prevent erosion.

Design and Installation Specifications

Seed retention/detention ponds as required.

Install channels intended for vegetation before starting major earthwork and hydroseed with a Bonded Fiber Matrix. For vegetated channels that will have high flows, install erosion control blankets over hydroseed. Before allowing water to flow in vegetated channels, establish 75 percent vegetation cover. If vegetated channels cannot be established by seed before water flow; install sod in the channel bottom—over hydromulch and erosion control blankets.

- Confirm the installation of all required surface water control measures to prevent seed from washing away.
- Hydroseed applications shall include a minimum of 1,500 pounds per acre of mulch with 3 percent tackifier. See BMP C121: Mulching for specifications.
- Areas that will have seeding only and not landscaping may need compost or meal-based mulch included in the hydroseed in order to establish vegetation. Re-install native topsoil on the disturbed soil surface before application.
- When installing seed via hydroseeding operations, only about 1/3 of the seed actually ends up in contact with the soil surface. This reduces the ability to establish a good stand of grass quickly. To overcome this, consider increasing seed quantities by up to 50 percent.
- Enhance vegetation establishment by dividing the hydromulch operation into two phases:

  1. Phase 1- Install all seed and fertilizer with 25-30 percent mulch and tackifier onto soil in the first lift.
  2. Phase 2- Install the rest of the mulch and tackifier over the first lift.

  Or, enhance vegetation by:

  1. Installing the mulch, seed, fertilizer, and tackifier in one lift.
  2. Spread or blow straw over the top of the hydromulch at a rate of 800-1000 pounds per acre.
  3. Hold straw in place with a standard tackifier.

  Both of these approaches will increase cost moderately but will greatly improve and enhance vegetative establishment. The increased cost may be offset by the reduced need for:

  - Irrigation.
  - Reapplication of mulch.
  - Repair of failed slope surfaces.

  This technique works with standard hydromulch (1,500 pounds per acre minimum) and BFM/MBFMs (3,000 pounds per acre minimum).
- Seed may be installed by hand if:
  - Temporary and covered by straw, mulch, or topsoil.
  - Permanent in small areas (usually less than 1 acre) and covered with mulch, topsoil, or erosion blankets.
  - The seed mixes listed in the tables below include recommended mixes for both temporary and permanent seeding.

- Apply these mixes, with the exception of the wetland mix, at a rate of 120 pounds per acre. This rate can be reduced if soil amendments or slow-release fertilizers are used.
- Consult the local suppliers or the local conservation district for their recommendations because the appropriate mix depends on a variety of factors, including location, exposure, soil type, slope, and expected foot traffic. Alternative seed mixes approved by the local authority may be used.
- Other mixes may be appropriate, depending on the soil type and hydrology of the area.

- Table 4.1.2 lists the standard mix for areas requiring a temporary vegetative cover.

Table 4.1.2
Temporary Erosion Control Seed Mix

	% Weight	% Purity	% Germination
Chewings or annual blue grass *Festuca rubra var. commutata* or *Poa anna*	40	98	90
Perennial rye - *Lolium perenne*	50	98	90
Redtop or colonial bentgrass *Agrostis alba* or *Agrostis tenuis*	5	92	85
White dutch clover *Trifolium repens*	5	98	90

- Table 4.1.3 lists a recommended mix for landscaping seed.

Table 4.1.3
Landscaping Seed Mix

	% Weight	% Purity	% Germination
Perennial rye blend *Lolium perenne*	70	98	90
Chewings and red fescue blend *Festuca rubra var. commutata* or *Festuca rubra*	30	98	90

- Table 4.1.4 lists a turf seed mix for dry situations where there is no need for watering. This mix requires very little maintenance.

Table 4.1.4
Low-Growing Turf Seed Mix

	% Weight	% Purity	% Germination
Dwarf tall fescue (several varieties) *Festuca arundinacea var.*	45	98	90
Dwarf perennial rye (Barclay) *Lolium perenne var. barclay*	30	98	90
Red fescue *Festuca rubra*	20	98	90
Colonial bentgrass *Agrostis tenuis*	5	98	90

- Table 4.1.5 lists a mix for bioswales and other intermittently wet areas.

Table 4.1.5
Bioswale Seed Mix*

	% Weight	% Purity	% Germination
Tall or meadow fescue *Festuca arundinacea* or *Festuca elatior*	75-80	98	90
Seaside/Creeping bentgrass *Agrostis palustris*	10-15	92	85
Redtop bentgrass *Agrostis alba* or *Agrostis gigantea*	5-10	90	80

* *Modified Briargreen, Inc. Hydroseeding Guide Wetlands Seed Mix*

- Table 4.1.6 lists a low-growing, relatively non-invasive seed mix appropriate for very wet areas that are not regulated wetlands. Apply this mixture at a rate of 60 pounds per acre. Consult Hydraulic Permit Authority (HPA) for seed mixes if applicable.

Table 4.1.6
Wet Area Seed Mix*

	% Weight	% Purity	% Germination
Tall or meadow fescue *Festuca arundinacea* or *Festuca elatior*	60-70	98	90
Seaside/Creeping bentgrass *Agrostis palustris*	10-15	98	85
Meadow foxtail *Alepocurus pratensis*	10-15	90	80
Alsike clover *Trifolium hybridum*	1-6	98	90
Redtop bentgrass *Agrostis alba*	1-6	92	85

** Modified Briargreen, Inc. Hydroseeding Guide Wetlands Seed Mix*

- Table 4.1.7 lists a recommended meadow seed mix for infrequently maintained areas or non-maintained areas where colonization by native plants is desirable. Likely applications include rural road and utility right-of-way. Seeding should take place in September or very early October in order to obtain adequate establishment prior to the winter months. Consider the appropriateness of clover, a fairly invasive species, in the mix. Amending the soil can reduce the need for clover.

Table 4.1.7
Meadow Seed Mix

	% Weight	% Purity	% Germination
Redtop or Oregon bentgrass *Agrostis alba* or *Agrostis oregonensis*	20	92	85
Red fescue *Festuca rubra*	70	98	90
White dutch clover *Trifolium repens*	10	98	90

- **Roughening and Rototilling:**
  - The seedbed should be firm and rough. Roughen all soil no matter what the slope. Track walk slopes before seeding if engineering purposes require compaction. Backblading or smoothing of slopes greater than 4H:1V is not allowed if they are to be seeded.
  - Restoration-based landscape practices require deeper incorporation than that provided by a simple single-pass rototilling treatment. Wherever practical, initially rip the subgrade to improve long-term permeability, infiltration, and water inflow qualities. At a minimum, permanent areas shall use soil amendments to achieve organic matter and permeability performance defined in engineered soil/landscape systems. For systems that are deeper than 8 inches complete the rototilling process in multiple lifts, or prepare the engineered soil system per specifications and place to achieve the specified depth.
- **Fertilizers:**
  - Conducting soil tests to determine the exact type and quantity of fertilizer is recommended. This will prevent the over-application of fertilizer.
  - Organic matter is the most appropriate form of fertilizer because it provides nutrients (including nitrogen, phosphorus, and potassium) in the least water-soluble form.
  - In general, use 10-4-6 N-P-K (nitrogen-phosphorus-potassium) fertilizer at a rate of 90 pounds per acre. Always use slow-release fertilizers because they are more efficient and have fewer environmental impacts. Do not add fertilizer to the hydromulch machine, or agitate, more than 20 minutes before use. Too much agitation destroys the slow-release coating.
  - There are numerous products available that take the place of chemical fertilizers. These include several with seaweed extracts that are beneficial to soil microbes and organisms. If 100 percent cottonseed meal is used as the mulch in hydroseed, chemical fertilizer may not be necessary. Cottonseed meal provides a good source of long-term, slow-release, available nitrogen.
- **Bonded Fiber Matrix and Mechanically Bonded Fiber Matrix:**
  - On steep slopes use Bonded Fiber Matrix (BFM) or Mechanically Bonded Fiber Matrix (MBFM) products. Apply BFM/MBFM products at a minimum rate of 3,000 pounds per acre of mulch with approximately 10 percent tackifier. Achieve a minimum of 95 percent soil coverage during application. Numerous products are available commercially. Installed products per manufacturer's instructions. Most products require 24-36 hours to cure before rainfall and cannot be installed on wet or saturated soils.

Generally, products come in 40-50 pound bags and include all necessary ingredients except for seed and fertilizer.

- BFMs and MBFMs provide good alternatives to blankets in most areas requiring vegetation establishment. Advantages over blankets include:
  - BFM and MBFMs do not require surface preparation.
  - Helicopters can assist in installing BFM and MBFMs in remote areas.
  - On slopes steeper than 2.5H:1V, blanket installers may require ropes and harnesses for safety.
  - Installing BFM and MBFMs can save at least $1,000 per acre compared to blankets.

Maintenance Standards

Reseed any seeded areas that fail to establish at least 80 percent cover (100 percent cover for areas that receive sheet or concentrated flows). If reseeding is ineffective, use an alternate method such as sodding, mulching, or nets/blankets. If winter weather prevents adequate grass growth, this time limit may be relaxed at the discretion of the local authority when sensitive areas would otherwise be protected.

- Reseed and protect by mulch any areas that experience erosion after achieving adequate cover. Reseed and protect by mulch any eroded area.
- Supply seeded areas with adequate moisture, but do not water to the extent that it causes runoff.

Approved as Equivalent

Ecology has approved products as able to meet the requirements of BMP C120. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept this product approved as equivalent, or may require additional testing prior to consideration for local use. The products are available for review on Ecology's website at http://www.ecy.wa.gov/programs/wq/stormwater/newtech/equivalent.html.

BMP C121: Mulching

Purpose

Mulching soils provides immediate temporary protection from erosion. Mulch also enhances plant establishment by conserving moisture, holding fertilizer, seed, and topsoil in place, and moderating soil temperatures. There is an enormous variety of mulches that can be used. This section discusses only the most common types of mulch.

Conditions of Use

As a temporary cover measure, mulch should be used:

- For less than 30 days on disturbed areas that require cover.
- At all times for seeded areas, especially during the wet season and during the hot summer months.

- During the wet season on slopes steeper than 3H:1V with more than 10 feet of vertical relief.

Mulch may be applied at any time of the year and must be refreshed periodically.

- For seeded areas mulch may be made up of 100 percent: cottonseed meal; fibers made of wood, recycled cellulose, hemp, kenaf; compost; or blends of these. Tackifier shall be plant-based, such as guar or alpha plantago, or chemical-based such as polyacrylamide or polymers. Any mulch or tackifier product used shall be installed per manufacturer's instructions. Generally, mulches come in 40-50 pound bags. Seed and fertilizer are added at time of application.

Design and Installation Specifications

For mulch materials, application rates, and specifications, see Table 4.1.8. Always use a 2-inch minimum mulch thickness; increase the thickness until the ground is 95% covered (i.e. not visible under the mulch layer). Note: Thickness may be increased for disturbed areas in or near sensitive areas or other areas highly susceptible to erosion.

Where the option of "Compost" is selected, it should be a coarse compost that meets the following size gradations when tested in accordance with the U.S. Composting Council "Test Methods for the Examination of Compost and Composting" (TMECC) Test Method 02.02-B.

Coarse Compost

Minimum Percent passing 3" sieve openings 100%

Minimum Percent passing 1" sieve openings 90%

Minimum Percent passing ¾" sieve openings 70%

Minimum Percent passing ¼" sieve openings 40%

Mulch used within the ordinary high-water mark of surface waters should be selected to minimize potential flotation of organic matter. Composted organic materials have higher specific gravities (densities) than straw, wood, or chipped material. Consult Hydraulic Permit Authority (HPA) for mulch mixes if applicable.

Maintenance Standards

- The thickness of the cover must be maintained.
- Any areas that experience erosion shall be remulched and/or protected with a net or blanket. If the erosion problem is drainage related, then the problem shall be fixed and the eroded area remulched.

Table 4.1.8
Mulch Standards and Guidelines

Mulch Material	Quality Standards	Application Rates	Remarks
Straw	Air-dried; free from undesirable seed and coarse material.	2"-3" thick; 5 bales per 1,000 sf or 2-3 tons per acre	Cost-effective protection when applied with adequate thickness. Hand-application generally requires greater thickness than blown straw. The thickness of straw may be reduced by half when used in conjunction with seeding. In windy areas straw must be held in place by crimping, using a tackifier, or covering with netting. Blown straw always has to be held in place with a tackifier as even light winds will blow it away. Straw, however, has several deficiencies that should be considered when selecting mulch materials. It often introduces and/or encourages the propagation of weed species and it has no significant long-term benefits. It should also not be used within the ordinary high-water elevation of surface waters (due to flotation).
Hydromulch	No growth inhibiting factors.	Approx. 25-30 lbs per 1,000 sf or 1,500 - 2,000 lbs per acre	Shall be applied with hydromulcher. Shall not be used without seed and tackifier unless the application rate is at least doubled. Fibers longer than about ¾-1 inch clog hydromulch equipment. Fibers should be kept to less than ¾ inch.
Compost	No visible water or dust during handling. Must be produced per WAC 173-350, Solid Waste Handling Standards, but may have up to 35% biosolids.	2" thick min.; approx. 100 tons per acre (approx. 800 lbs per yard)	More effective control can be obtained by increasing thickness to 3". Excellent mulch for protecting final grades until landscaping because it can be directly seeded or tilled into soil as an amendment. Compost used for mulch has a coarser size gradation than compost used for BMP C125 or BMP T5.13 (see Chapter 5 of Volume V of this manual) It is more stable and practical to use in wet areas and during rainy weather conditions. Do not use near wetlands or near phosphorous impaired water bodies.
Chipped Site Vegetation	Average size shall be several inches. Gradations from fines to 6 inches in length for texture, variation, and interlocking properties.	2" thick min.;	This is a cost-effective way to dispose of debris from clearing and grubbing, and it eliminates the problems associated with burning. Generally, it should not be used on slopes above approx. 10% because of its tendency to be transported by runoff. It is not recommended within 200 feet of surface waters. If seeding is expected shortly after mulch, the decomposition of the chipped vegetation may tie up nutrients important to grass establishment.
Wood-based Mulch or Wood Straw	No visible water or dust during handling. Must be purchased from a supplier with a Solid Waste Handling Permit or one exempt from solid waste regulations.	2” thick min.; approx. 100 tons per acre (approx. 800 lbs. per cubic yard)	This material is often called “hog or hogged fuel.” The use of mulch ultimately improves the organic matter in the soil. Special caution is advised regarding the source and composition of wood-based mulches. Its preparation typically does not provide any weed seed control, so evidence of residual vegetation in its composition or known inclusion of weed plants or seeds should be monitored and prevented (or minimized).
Wood Strand Mulch	A blend of loose, long, thin wood pieces derived from native conifer or deciduous trees with high length-to-width ratio.	2” thick min.	Cost-effective protection when applied with adequate thickness. A minimum of 95-percent of the wood strand shall have lengths between 2 and 10-inches, with a width and thickness between 1/16 and ⅜-inches. The mulch shall not contain resin, tannin, or other compounds in quantities that would be detrimental to plant life. Sawdust or wood shavings shall not be used as mulch. (WSDOT specification (9-14.4(4))

BMP C123: Plastic Covering

Purpose

Plastic covering provides immediate, short-term erosion protection to slopes and disturbed areas.

Conditions of Use

Plastic covering may be used on disturbed areas that require cover measures for less than 30 days, except as stated below.

- Plastic is particularly useful for protecting cut and fill slopes and stockpiles. Note: The relatively rapid breakdown of most polyethylene sheeting makes it unsuitable for long-term (greater than six months) applications.
- Due to rapid runoff caused by plastic covering, do not use this method upslope of areas that might be adversely impacted by concentrated runoff. Such areas include steep and/or unstable slopes.
- Plastic sheeting may result in increased runoff volumes and velocities, requiring additional on-site measures to counteract the increases. Creating a trough with wattles or other material can convey clean water away from these areas.
- To prevent undercutting, trench and backfill rolled plastic covering products.
- While plastic is inexpensive to purchase, the added cost of installation, maintenance, removal, and disposal make this an expensive material, up to $1.50-2.00 per square yard.
- Whenever plastic is used to protect slopes install water collection measures at the base of the slope. These measures include plastic-covered berms, channels, and pipes used to covey clean rainwater away from bare soil and disturbed areas. Do not mix clean runoff from a plastic covered slope with dirty runoff from a project.
- Other uses for plastic include:
    1. Temporary ditch liner.
    2. Pond liner in temporary sediment pond.
    3. Liner for bermed temporary fuel storage area if plastic is not reactive to the type of fuel being stored.
    4. Emergency slope protection during heavy rains.
    5. Temporary drainpipe (“elephant trunk”) used to direct water.

Design and Installation Specifications

- Plastic slope cover must be installed as follows:
    1. Run plastic up and down slope, not across slope.
    2. Plastic may be installed perpendicular to a slope if the slope length is less than 10 feet.
    3. Minimum of 8-inch overlap at seams.

4. On long or wide slopes, or slopes subject to wind, tape all seams.
5. Place plastic into a small (12-inch wide by 6-inch deep) slot trench at the top of the slope and backfill with soil to keep water from flowing underneath.
6. Place sand filled burlap or geotextile bags every 3 to 6 feet along seams and tie them together with twine to hold them in place.
7. Inspect plastic for rips, tears, and open seams regularly and repair immediately. This prevents high velocity runoff from contacting bare soil which causes extreme erosion.
8. Sandbags may be lowered into place tied to ropes. However, all sandbags must be staked in place.

- Plastic sheeting shall have a minimum thickness of 0.06 millimeters.
- If erosion at the toe of a slope is likely, a gravel berm, riprap, or other suitable protection shall be installed at the toe of the slope in order to reduce the velocity of runoff.

Maintenance Standards

- Torn sheets must be replaced and open seams repaired.
- Completely remove and replace the plastic if it begins to deteriorate due to ultraviolet radiation.
- Completely remove plastic when no longer needed.
- Dispose of old tires used to weight down plastic sheeting appropriately.

Approved as Equivalent

Ecology has approved products as able to meet the requirements of BMP C123. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept this product approved as equivalent, or may require additional testing prior to consideration for local use. The products are available for review on Ecology's website at http://www.ecy.wa.gov/programs/wq/stormwater/newtech/equivalent.html

BMP C151: Concrete Handling

Purpose

Concrete work can generate process water and slurry that contain fine particles and high pH, both of which can violate water quality standards in the receiving water. Concrete spillage or concrete discharge to surface waters of the State is prohibited. Use this BMP to minimize and eliminate concrete, concrete process water, and concrete slurry from entering waters of the state.

Conditions of Use

Any time concrete is used, utilize these management practices. Concrete construction projects include, but are not limited to, the following:

- Curbs
- Sidewalks
- Roads
- Bridges
- Foundations
- Floors
- Runways

Design and Installation

- Assure that washout of concrete trucks, chutes, pumps, and internals is performed at an approved off-site location or in designated concrete

Specifications

washout areas. Do not wash out concrete trucks onto the ground, or into storm drains, open ditches, streets, or streams. Refer to BMP C154 for information on concrete washout areas.

- Return unused concrete remaining in the truck and pump to the originating batch plant for recycling. Do not dump excess concrete on site, except in designated concrete washout areas.
- Wash off hand tools including, but not limited to, screeds, shovels, rakes, floats, and trowels into formed areas only.
- Wash equipment difficult to move, such as concrete pavers in areas that do not directly drain to natural or constructed stormwater conveyances.
- Do not allow washdown from areas, such as concrete aggregate driveways, to drain directly to natural or constructed stormwater conveyances.
- Contain washwater and leftover product in a lined container when no formed areas are available. Dispose of contained concrete in a manner that does not violate ground water or surface water quality standards.
- Always use forms or solid barriers for concrete pours, such as pilings, within 15-feet of surface waters.
- Refer to BMPs C252 and C253 for pH adjustment requirements.
- Refer to the Construction Stormwater General Permit for pH monitoring requirements if the project involves one of the following activities:
  - Significant concrete work (greater than 1,000 cubic yards poured concrete or recycled concrete used over the life of a project).
  - The use of engineered soils amended with (but not limited to) Portland cement-treated base, cement kiln dust or fly ash.
  - Discharging stormwater to segments of water bodies on the 303(d) list (Category 5) for high pH.

Maintenance Standards

Check containers for holes in the liner daily during concrete pours and repair the same day.

BMP C152: Sawcutting and Surfacing Pollution Prevention

Purpose

Sawcutting and surfacing operations generate slurry and process water that contains fine particles and high pH (concrete cutting), both of which can violate the water quality standards in the receiving water. Concrete spillage or concrete discharge to surface waters of the State is prohibited. Use this BMP to minimize and eliminate process water and slurry created through sawcutting or surfacing from entering waters of the State.

Conditions of Use

Utilize these management practices anytime sawcutting or surfacing operations take place. Sawcutting and surfacing operations include, but are not limited to, the following:

- Sawing
- Coring
- Grinding
- Roughening
- Hydro-demolition
- Bridge and road surfacing

Design and Installation Specifications

- Vacuum slurry and cuttings during cutting and surfacing operations.
- Slurry and cuttings shall not remain on permanent concrete or asphalt pavement overnight.
- Slurry and cuttings shall not drain to any natural or constructed drainage conveyance including stormwater systems. This may require temporarily blocking catch basins.
- Dispose of collected slurry and cuttings in a manner that does not violate ground water or surface water quality standards.
- Do not allow process water generated during hydro-demolition, surface roughening or similar operations to drain to any natural or constructed drainage conveyance including stormwater systems. Dispose process water in a manner that does not violate ground water or surface water quality standards.
- Handle and dispose cleaning waste material and demolition debris in a manner that does not cause contamination of water. Dispose of sweeping material from a pick-up sweeper at an appropriate disposal site.

Maintenance Standards

Continually monitor operations to determine whether slurry, cuttings, or process water could enter waters of the state. If inspections show that a violation of water quality standards could occur, stop operations and immediately implement preventive measures such as berms, barriers, secondary containment, and vacuum trucks.

BMP C160: Certified Erosion and Sediment Control Lead

Purpose

The project proponent designates at least one person as the responsible representative in charge of erosion and sediment control (ESC), and water quality protection. The designated person shall be the Certified Erosion and Sediment Control Lead (CESCL) who is responsible for ensuring compliance with all local, state, and federal erosion and sediment control and water quality requirements.

Conditions of Use

A CESCL shall be made available on projects one acre or larger that discharge stormwater to surface waters of the state. Sites less than one acre may have a person without CESCL certification conduct inspections; sampling is not required on sites that disturb less than an acre.

- The CESCL shall:
  - Have a current certificate proving attendance in an erosion and sediment control training course that meets the minimum ESC training and certification requirements established by Ecology (see details below).

    Ecology will maintain a list of ESC training and certification providers at:
    http://www.ecy.wa.gov/programs/wq/stormwater/cescl.html

    OR

  - Be a Certified Professional in Erosion and Sediment Control (CPESC); for additional information go to: www.cpesc.net

Specifications

- Certification shall remain valid for three years.
- The CESCL shall have authority to act on behalf of the contractor or developer and shall be available, or on-call, 24 hours per day throughout the period of construction.
- The Construction SWPPP shall include the name, telephone number, fax number, and address of the designated CESCL.
- A CESCL may provide inspection and compliance services for multiple construction projects in the same geographic region.

Duties and responsibilities of the CESCL shall include, but are not limited to the following:

- Maintaining permit file on site at all times which includes the Construction SWPPP and any associated permits and plans.
- Directing BMP installation, inspection, maintenance, modification, and removal.

- Updating all project drawings and the Construction SWPPP with changes made.
- Completing any sampling requirements including reporting results using WebDMR.
- Keeping daily logs, and inspection reports. Inspection reports should include:
    - Inspection date/time.
    - Weather information; general conditions during inspection and approximate amount of precipitation since the last inspection.
    - A summary or list of all BMPs implemented, including observations of all erosion/sediment control structures or practices. The following shall be noted:
        1. Locations of BMPs inspected.
        2. Locations of BMPs that need maintenance.
        3. Locations of BMPs that failed to operate as designed or intended.
        4. Locations of where additional or different BMPs are required.
    - Visual monitoring results, including a description of discharged stormwater. The presence of suspended sediment, turbid water, discoloration, and oil sheen shall be noted, as applicable.
    - Any water quality monitoring performed during inspection.
    - General comments and notes, including a brief description of any BMP repairs, maintenance or installations made as a result of the inspection.
- Facilitate, participate in, and take corrective actions resulting from inspections performed by outside agencies or the owner.

BMP C162: Scheduling

Purpose Sequencing a construction project reduces the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking.

Conditions of Use The construction sequence schedule is an orderly listing of all major land-disturbing activities together with the necessary erosion and sedimentation control measures planned for the project. This type of schedule guides the contractor on work to be done before other work is started so that serious erosion and sedimentation problems can be avoided.

Following a specified work schedule that coordinates the timing of land-disturbing activities and the installation of control measures is perhaps the most cost-effective way of controlling erosion during construction. The removal of surface ground cover leaves a site vulnerable to accelerated

erosion. Construction procedures that limit land clearing provide timely installation of erosion and sedimentation controls, and restore protective cover quickly can significantly reduce the erosion potential of a site.

Design Considerations

- Minimize construction during rainy periods.
- Schedule projects to disturb only small portions of the site at any one time. Complete grading as soon as possible. Immediately stabilize the disturbed portion before grading the next portion. Practice staged seeding in order to revegetate cut and fill slopes as the work progresses.

BMP C208: Triangular Silt Dike (TSD) (Geotextile-Encased Check Dam)

Purpose

Triangular silt dikes may be used as check dams, for perimeter protection, for temporary soil stockpile protection, for drop inlet protection, or as a temporary interceptor dike.

Conditions of use

- May be used on soil or pavement with adhesive or staples.
- TSDs have been used to build temporary:
  1. sediment ponds;
  2. diversion ditches;
  3. concrete wash out facilities;
  4. curbing;
  5. water bars;
  6. level spreaders; and,
  7. berms.

Design and Installation Specifications

Made of urethane foam sewn into a woven geosynthetic fabric.

It is triangular, 10 inches to 14 inches high in the center, with a 20-inch to 28-inch base. A 2–foot apron extends beyond both sides of the triangle along its standard section of 7 feet. A sleeve at one end allows attachment of additional sections as needed.

- Install with ends curved up to prevent water from flowing around the ends.
- The fabric flaps and check dam units are attached to the ground with wire staples. Wire staples should be No. 11 gauge wire and should be 200 mm to 300 mm in length.
- When multiple units are installed, the sleeve of fabric at the end of the unit shall overlap the abutting unit and be stapled.
- Check dams should be located and installed as soon as construction will allow.
- Check dams should be placed perpendicular to the flow of water.
- When used as check dams, the leading edge must be secured with rocks, sandbags, or a small key slot and staples.
- In the case of grass-lined ditches and swales, check dams and accumulated sediment shall be removed when the grass has matured sufficiently to protect the ditch or swale unless the slope of the swale is greater than 4 percent. The area beneath the check dams shall be seeded and mulched immediately after dam removal.

Maintenance

- Triangular silt dams shall be inspected for performance and sediment

Standards

accumulation during and after each runoff producing rainfall. Sediment shall be removed when it reaches one half the height of the dam.

- Anticipate submergence and deposition above the triangular silt dam and erosion from high flows around the edges of the dam. Immediately repair any damage or any undercutting of the dam.

BMP C209: Outlet Protection

Purpose

Outlet protection prevents scour at conveyance outlets and minimizes the potential for downstream erosion by reducing the velocity of concentrated stormwater flows.

Conditions of use

Outlet protection is required at the outlets of all ponds, pipes, ditches, or other conveyances, and where runoff is conveyed to a natural or manmade drainage feature such as a stream, wetland, lake, or ditch.

Design and Installation Specifications

The receiving channel at the outlet of a culvert shall be protected from erosion by rock lining a minimum of 6 feet downstream and extending up the channel sides a minimum of 1–foot above the maximum tailwater elevation or 1-foot above the crown, whichever is higher. For large pipes (more than 18 inches in diameter), the outlet protection lining of the channel is lengthened to four times the diameter of the culvert.

- Standard wingwalls, and tapered outlets and paved channels should also be considered when appropriate for permanent culvert outlet protection. (See WSDOT Hydraulic Manual, available through WSDOT Engineering Publications).
- Organic or synthetic erosion blankets, with or without vegetation, are usually more effective than rock, cheaper, and easier to install. Materials can be chosen using manufacturer product specifications. ASTM test results are available for most products and the designer can choose the correct material for the expected flow.
- With low flows, vegetation (including sod) can be effective.
- The following guidelines shall be used for riprap outlet protection:
    1. If the discharge velocity at the outlet is less than 5 fps (pipe slope less than 1 percent), use 2-inch to 8-inch riprap. Minimum thickness is 1-foot.
    2. For 5 to 10 fps discharge velocity at the outlet (pipe slope less than 3 percent), use 24-inch to 48-inch riprap. Minimum thickness is 2 feet.
    3. For outlets at the base of steep slope pipes (pipe slope greater than 10 percent), an engineered energy dissipater shall be used.
- Filter fabric or erosion control blankets should always be used under riprap to prevent scour and channel erosion.

- New pipe outfalls can provide an opportunity for low-cost fish habitat improvements. For example, an alcove of low-velocity water can be created by constructing the pipe outfall and associated energy dissipater back from the stream edge and digging a channel, over-widened to the upstream side, from the outfall. Overwintering juvenile and migrating adult salmonids may use the alcove as shelter during high flows. Bank stabilization, bioengineering, and habitat features may be required for disturbed areas. This work may require a HPA. See Volume V for more information on outfall system design.

Maintenance Standards

- Inspect and repair as needed.
- Add rock as needed to maintain the intended function.
- Clean energy dissipater if sediment builds up.

BMP C220: Storm Drain Inlet Protection

Purpose

Storm drain inlet protection prevents coarse sediment from entering drainage systems prior to permanent stabilization of the disturbed area.

Conditions of Use

Use storm drain inlet protection at inlets that are operational before permanent stabilization of the disturbed drainage area. Provide protection for all storm drain inlets downslope and within 500 feet of a disturbed or construction area, unless conveying runoff entering catch basins to a sediment pond or trap.

Also consider inlet protection for lawn and yard drains on new home construction. These small and numerous drains coupled with lack of gutters in new home construction can add significant amounts of sediment into the roof drain system. If possible delay installing lawn and yard drains until just before landscaping or cap these drains to prevent sediment from entering the system until completion of landscaping. Provide 18-inches of sod around each finished lawn and yard drain.

Table 4.2.2 lists several options for inlet protection. All of the methods for storm drain inlet protection tend to plug and require a high frequency of maintenance. Limit drainage areas to one acre or less. Possibly provide emergency overflows with additional end-of-pipe treatment where stormwater ponding would cause a hazard.

Table 4.2.2
Storm Drain Inlet Protection

Type of Inlet Protection	Emergency Overflow	Applicable for Paved/ Earthen Surfaces	Conditions of Use
Drop Inlet Protection			
Excavated drop inlet protection	Yes, temporary flooding will occur	Earthen	Applicable for heavy flows. Easy to maintain. Large area Requirement: 30' X 30'/acre
Block and gravel drop inlet protection	Yes	Paved or Earthen	Applicable for heavy concentrated flows. Will not pond.
Gravel and wire drop inlet protection	No		Applicable for heavy concentrated flows. Will pond. Can withstand traffic.
Catch basin filters	Yes	Paved or Earthen	Frequent maintenance required.
Curb Inlet Protection			
Curb inlet protection with a wooden weir	Small capacity overflow	Paved	Used for sturdy, more compact installation.
Block and gravel curb inlet protection	Yes	Paved	Sturdy, but limited filtration.
Culvert Inlet Protection			
Culvert inlet sediment trap			18 month expected life.

Design and Installation Specifications

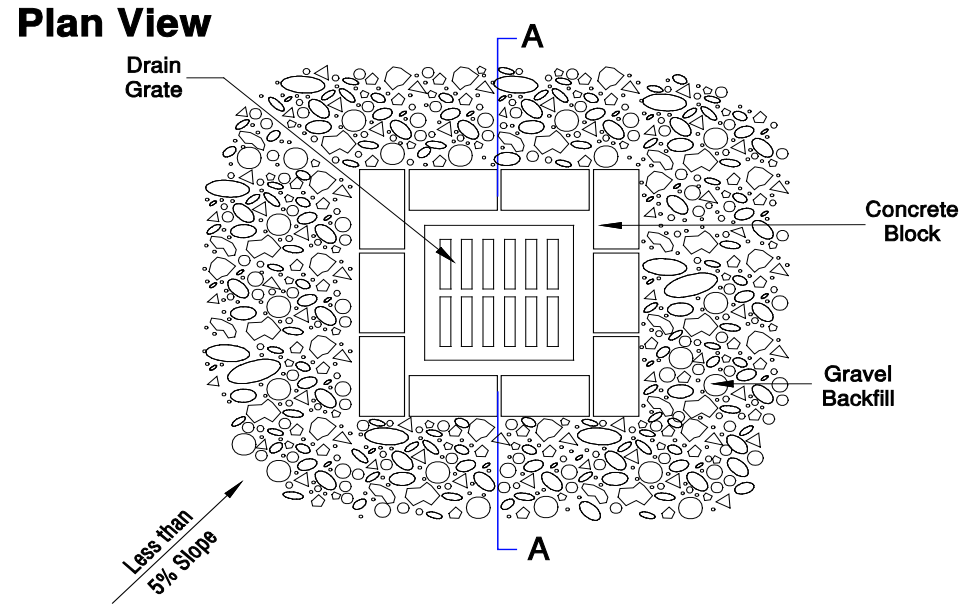
Excavated Drop Inlet Protection - An excavated impoundment around the storm drain. Sediment settles out of the stormwater prior to entering the storm drain.

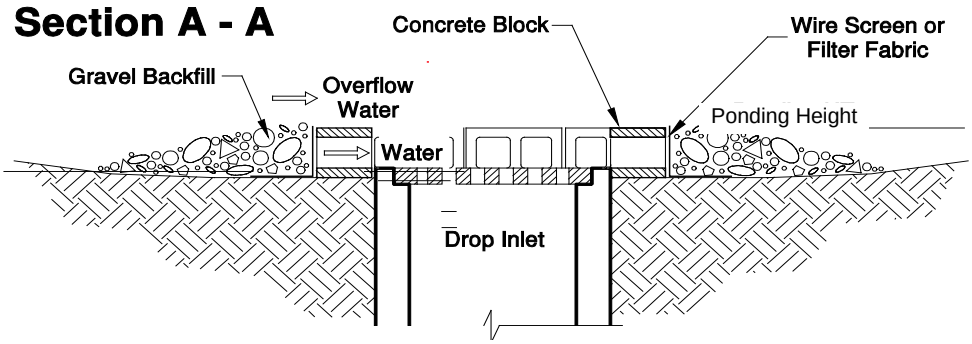
- Provide a depth of 1-2 ft as measured from the crest of the inlet structure.
- Slope sides of excavation no steeper than 2H:1V.
- Minimum volume of excavation 35 cubic yards.
- Shape basin to fit site with longest dimension oriented toward the longest inflow area.
- Install provisions for draining to prevent standing water problems.
- Clear the area of all debris.
- Grade the approach to the inlet uniformly.
- Drill weep holes into the side of the inlet.
- Protect weep holes with screen wire and washed aggregate.
- Seal weep holes when removing structure and stabilizing area.

- Build a temporary dike, if necessary, to the down slope side of the structure to prevent bypass flow.

Block and Gravel Filter - A barrier formed around the storm drain inlet with standard concrete blocks and gravel. See Figure 4.2.8.

- Provide a height of 1 to 2 feet above inlet.
- Recess the first row 2-inches into the ground for stability.
- Support subsequent courses by placing a 2x4 through the block opening.
- Do not use mortar.
- Lay some blocks in the bottom row on their side for dewatering the pool.
- Place hardware cloth or comparable wire mesh with ½-inch openings over all block openings.
- Place gravel just below the top of blocks on slopes of 2H:1V or flatter.
- An alternative design is a gravel donut.
- Provide an inlet slope of 3H:1V.
- Provide an outlet slope of 2H:1V.
- Provide a1-foot wide level stone area between the structure and the inlet.
- Use inlet slope stones 3 inches in diameter or larger.
- Use gravel ½- to ¾-inch at a minimum thickness of 1-foot for the outlet slope.





Notes:
1. Drop inlet sediment barriers are to be used for small, nearly level drainage areas. (less than 5%)
2. Excavate a basin of sufficient size adjacent to the drop inlet.
3. The top of the structure (ponding height) must be well below the ground elevation downslope to prevent runoff from bypassing the inlet. A temporary dike may be necessary on the downslope side of the structure.

Figure 4.2.8 – Block and Gravel Filter

Gravel and Wire Mesh Filter - A gravel barrier placed over the top of the inlet. This structure does not provide an overflow.

- Use a hardware cloth or comparable wire mesh with ½-inch openings.
- Use coarse aggregate.
- Provide a height 1-foot or more, 18-inches wider than inlet on all sides.
- Place wire mesh over the drop inlet so that the wire extends a minimum of 1-foot beyond each side of the inlet structure.
- Overlap the strips if more than one strip of mesh is necessary.

- Place coarse aggregate over the wire mesh.
- Provide at least a 12-inch depth of gravel over the entire inlet opening and extend at least 18-inches on all sides.

Catchbasin Filters – Use inserts designed by manufacturers for construction sites. The limited sediment storage capacity increases the amount of inspection and maintenance required, which may be daily for heavy sediment loads. To reduce maintenance requirements combine a catchbasin filter with another type of inlet protection. This type of inlet protection provides flow bypass without overflow and therefore may be a better method for inlets located along active rights-of-way.

- Provides 5 cubic feet of storage.
- Requires dewatering provisions.
- Provides a high-flow bypass that will not clog under normal use at a construction site.
- Insert the catchbasin filter in the catchbasin just below the grating.

Curb Inlet Protection with Wooden Weir – Barrier formed around a curb inlet with a wooden frame and gravel.

- Use wire mesh with ½-inch openings.
- Use extra strength filter cloth.
- Construct a frame.
- Attach the wire and filter fabric to the frame.
- Pile coarse washed aggregate against wire/fabric.
- Place weight on frame anchors.

Block and Gravel Curb Inlet Protection – Barrier formed around a curb inlet with concrete blocks and gravel. See Figure 4.2.9.

- Use wire mesh with ½-inch openings.
- Place two concrete blocks on their sides abutting the curb at either side of the inlet opening. These are spacer blocks.
- Place a 2x4 stud through the outer holes of each spacer block to align the front blocks.
- Place blocks on their sides across the front of the inlet and abutting the spacer blocks.
- Place wire mesh over the outside vertical face.
- Pile coarse aggregate against the wire to the top of the barrier.

Curb and Gutter Sediment Barrier – Sandbag or rock berm (riprap and aggregate) 3 feet high and 3 feet wide in a horseshoe shape. See Figure 4.2.10.

- Construct a horseshoe shaped berm, faced with coarse aggregate if using riprap, 3 feet high and 3 feet wide, at least 2 feet from the inlet.
- Construct a horseshoe shaped sedimentation trap on the outside of the berm sized to sediment trap standards for protecting a culvert inlet.

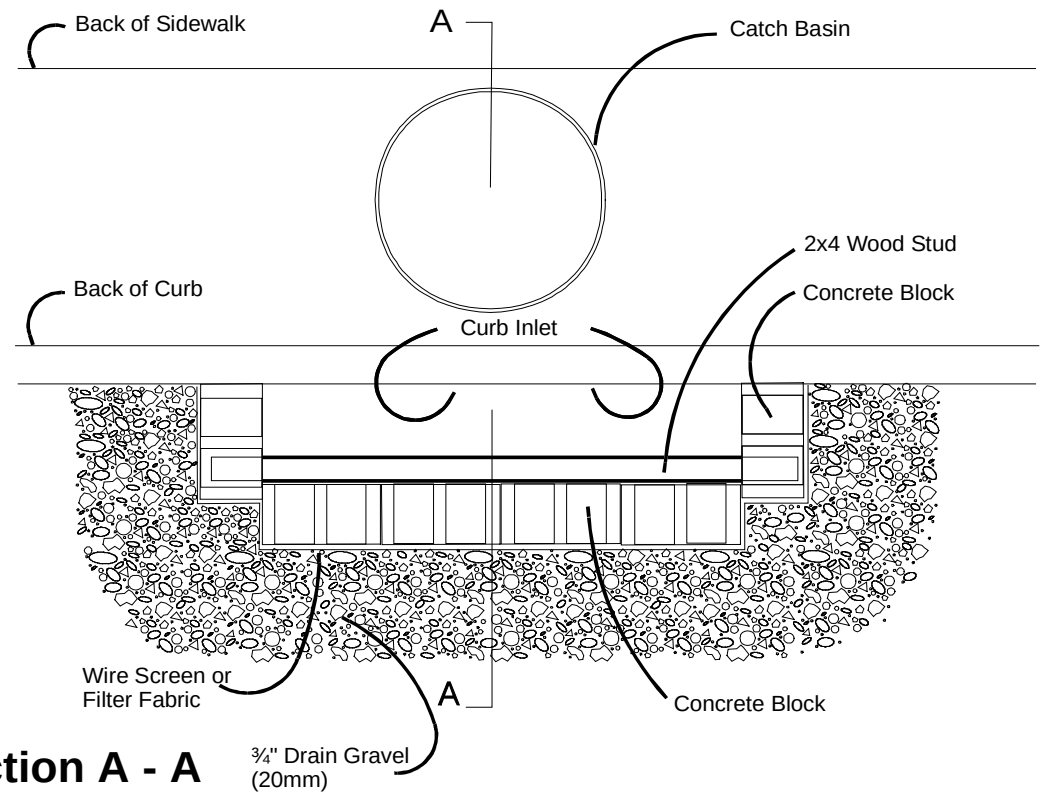
Maintenance Standards

- Inspect catch basin filters frequently, especially after storm events. Clean and replace clogged inserts. For systems with clogged stone filters: pull away the stones from the inlet and clean or replace. An alternative approach would be to use the clogged stone as fill and put fresh stone around the inlet.
- Do not wash sediment into storm drains while cleaning. Spread all excavated material evenly over the surrounding land area or stockpile and stabilize as appropriate.

Approved as Equivalent

Ecology has approved products as able to meet the requirements of BMP C220. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept this product approved as equivalent, or may require additional testing prior to consideration for local use. The products are available for review on Ecology's website at http://www.ecy.wa.gov/programs/wq/stormwater/newtech/equivalent.html

Plan View



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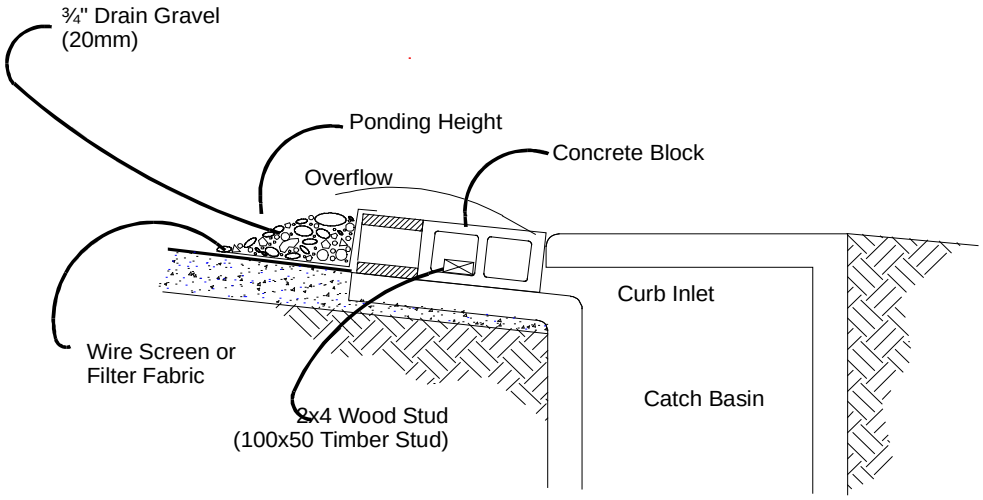


NOTES:
1. Use block and gravel type sediment barrier when curb inlet is located in gently sloping street segment, where water can pond and allow sediment to separate from runoff.
2. Barrier shall allow for overflow from severe storm event.
3. Inspect barriers and remove sediment after each storm event. Sediment and gravel must be removed from the traveled way immediately.

Figure 4.2.9 – Block and Gravel Curb Inlet Protection

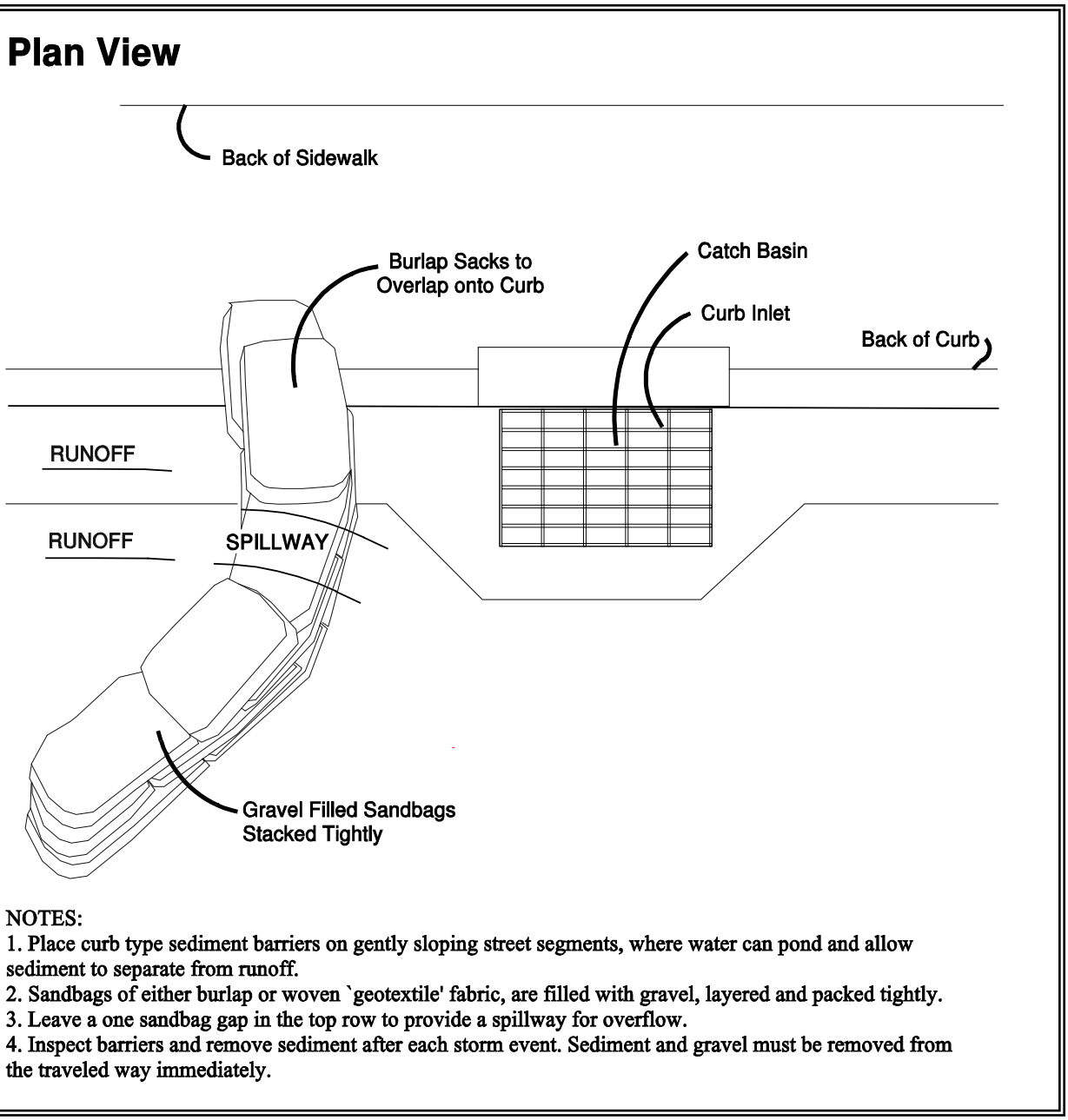


Figure 4.2.10 – Curb and Gutter Barrier

BMP C232: Gravel Filter Berm

Purpose

A gravel filter berm is constructed on rights-of-way or traffic areas within a construction site to retain sediment by using a filter berm of gravel or crushed rock.

Conditions of Use

Where a temporary measure is needed to retain sediment from rights-of-way or in traffic areas on construction sites.

Design and Installation Specifications

- Berm material shall be ¾ to 3 inches in size, washed well-grade gravel or crushed rock with less than 5 percent fines.
- Spacing of berms:
  - Every 300 feet on slopes less than 5 percent
  - Every 200 feet on slopes between 5 percent and 10 percent
  - Every 100 feet on slopes greater than 10 percent
- Berm dimensions:
  - 1 foot high with 3H:1V side slopes
  - 8 linear feet per 1 cfs runoff based on the 10-year, 24-hour design storm

Maintenance Standards

- Regular inspection is required. Sediment shall be removed and filter material replaced as needed.

BMP C233: Silt Fence

Purpose

Use of a silt fence reduces the transport of coarse sediment from a construction site by providing a temporary physical barrier to sediment and reducing the runoff velocities of overland flow. See Figure 4.2.12 for details on silt fence construction.

Conditions of Use

Silt fence may be used downslope of all disturbed areas.

- Silt fence shall prevent soil carried by runoff water from going beneath, through, or over the top of the silt fence, but shall allow the water to pass through the fence.
- Silt fence is not intended to treat concentrated flows, nor is it intended to treat substantial amounts of overland flow. Convey any concentrated flows through the drainage system to a sediment pond.
- Do not construct silt fences in streams or use in V-shaped ditches. Silt fences do not provide an adequate method of silt control for anything deeper than sheet or overland flow.

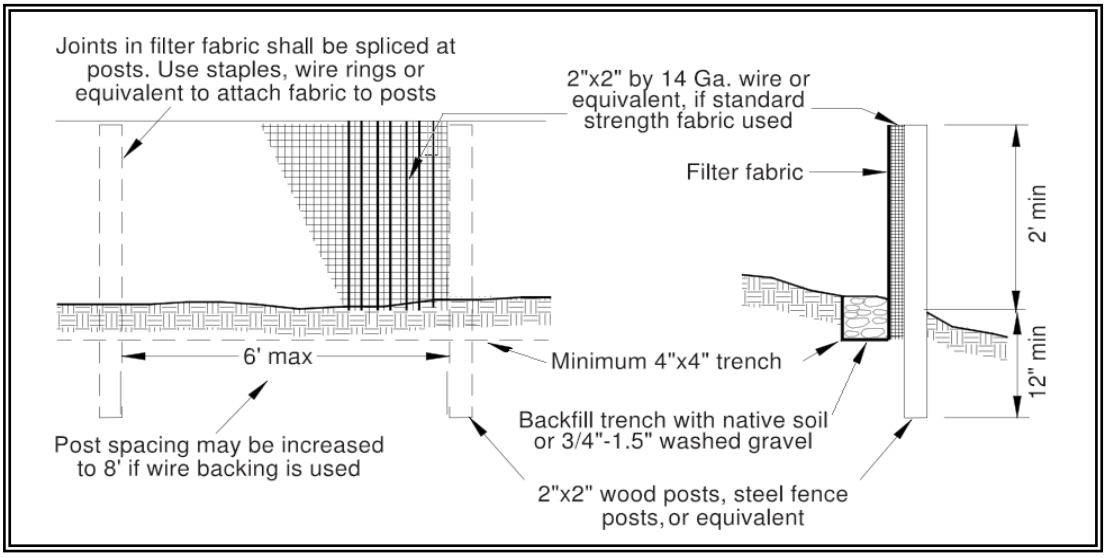


Figure 4.2.12 – Silt Fence

Design and Installation Specifications

- Use in combination with sediment basins or other BMPs.
- Maximum slope steepness (normal (perpendicular) to fence line) 1H:1V.
- Maximum sheet or overland flow path length to the fence of 100 feet.
- Do not allow flows greater than 0.5 cfs.
- The geotextile used shall meet the following standards. All geotextile properties listed below are minimum average roll values (i.e., the test result for any sampled roll in a lot shall meet or exceed the values shown in Table 4.2.3):

Table 4.2.3
Geotextile Standards

Polymeric Mesh AOS (ASTM D4751)	0.60 mm maximum for slit film woven (#30 sieve). 0.30 mm maximum for all other geotextile types (#50 sieve). 0.15 mm minimum for all fabric types (#100 sieve).
Water Permittivity (ASTM D4491)	0.02 sec^{-1} minimum
Grab Tensile Strength (ASTM D4632)	180 lbs. Minimum for extra strength fabric. 100 lbs minimum for standard strength fabric.
Grab Tensile Strength (ASTM D4632)	30% maximum
Ultraviolet Resistance (ASTM D4355)	70% minimum

- Support standard strength fabrics with wire mesh, chicken wire, 2-inch x 2-inch wire, safety fence, or jute mesh to increase the strength of the fabric. Silt fence materials are available that have synthetic mesh backing attached.

- Filter fabric material shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0°F. to 120°F.
- One-hundred percent biodegradable silt fence is available that is strong, long lasting, and can be left in place after the project is completed, if permitted by local regulations.
- Refer to Figure 4.2.12 for standard silt fence details. Include the following standard Notes for silt fence on construction plans and specifications:

    1. The contractor shall install and maintain temporary silt fences at the locations shown in the Plans.
    2. Construct silt fences in areas of clearing, grading, or drainage prior to starting those activities.
    3. The silt fence shall have a 2-feet min. and a 2½-feet max. height above the original ground surface.
    4. The filter fabric shall be sewn together at the point of manufacture to form filter fabric lengths as required. Locate all sewn seams at support posts. Alternatively, two sections of silt fence can be overlapped, provided the Contractor can demonstrate, to the satisfaction of the Engineer, that the overlap is long enough and that the adjacent fence sections are close enough together to prevent silt laden water from escaping through the fence at the overlap.
    5. Attach the filter fabric on the up-slope side of the posts and secure with staples, wire, or in accordance with the manufacturer's recommendations. Attach the filter fabric to the posts in a manner that reduces the potential for tearing.
    6. Support the filter fabric with wire or plastic mesh, dependent on the properties of the geotextile selected for use. If wire or plastic mesh is used, fasten the mesh securely to the up-slope side of the posts with the filter fabric up-slope of the mesh.
    7. Mesh support, if used, shall consist of steel wire with a maximum mesh spacing of 2-inches, or a prefabricated polymeric mesh. The strength of the wire or polymeric mesh shall be equivalent to or greater than 180 lbs. grab tensile strength. The polymeric mesh must be as resistant to the same level of ultraviolet radiation as the filter fabric it supports.
    8. Bury the bottom of the filter fabric 4-inches min. below the ground surface. Backfill and tamp soil in place over the buried portion of the filter fabric, so that no flow can pass beneath the fence and scouring cannot occur. When wire or polymeric back-up support

mesh is used, the wire or polymeric mesh shall extend into the ground 3-inches min.

9. Drive or place the fence posts into the ground 18-inches min. A 12–inch min. depth is allowed if topsoil or other soft subgrade soil is not present and 18-inches cannot be reached. Increase fence post min. depths by 6 inches if the fence is located on slopes of 3H:1V or steeper and the slope is perpendicular to the fence. If required post depths cannot be obtained, the posts shall be adequately secured by bracing or guying to prevent overturning of the fence due to sediment loading.
10. Use wood, steel or equivalent posts. The spacing of the support posts shall be a maximum of 6-feet. Posts shall consist of either:
    - Wood with dimensions of 2-inches by 2-inches wide min. and a 3-feet min. length. Wood posts shall be free of defects such as knots, splits, or gouges.
    - No. 6 steel rebar or larger.
    - ASTM A 120 steel pipe with a minimum diameter of 1-inch.
    - U, T, L, or C shape steel posts with a minimum weight of 1.35 lbs./ft.
    - Other steel posts having equivalent strength and bending resistance to the post sizes listed above.
11. Locate silt fences on contour as much as possible, except at the ends of the fence, where the fence shall be turned uphill such that the silt fence captures the runoff water and prevents water from flowing around the end of the fence.
12. If the fence must cross contours, with the exception of the ends of the fence, place gravel check dams perpendicular to the back of the fence to minimize concentrated flow and erosion. The slope of the fence line where contours must be crossed shall not be steeper than 3H:1V.
    - Gravel check dams shall be approximately 1-foot deep at the back of the fence. Gravel check dams shall be continued perpendicular to the fence at the same elevation until the top of the check dam intercepts the ground surface behind the fence.
    - Gravel check dams shall consist of crushed surfacing base course, gravel backfill for walls, or shoulder ballast. Gravel check dams shall be located every 10 feet along the fence where the fence must cross contours.

- Refer to Figure 4.2.13 for slicing method details. Silt fence installation using the slicing method specifications:

1. The base of both end posts must be at least 2- to 4-inches above the top of the filter fabric on the middle posts for ditch checks to drain properly. Use a hand level or string level, if necessary, to mark base points before installation.
2. Install posts 3- to 4-feet apart in critical retention areas and 6- to 7-feet apart in standard applications.
3. Install posts 24-inches deep on the downstream side of the silt fence, and as close as possible to the filter fabric, enabling posts to support the filter fabric from upstream water pressure.
4. Install posts with the nipples facing away from the filter fabric.
5. Attach the filter fabric to each post with three ties, all spaced within the top 8-inches of the filter fabric. Attach each tie diagonally 45 degrees through the filter fabric, with each puncture at least 1-inch vertically apart. Each tie should be positioned to hang on a post nipple when tightening to prevent sagging.
6. Wrap approximately 6-inches of fabric around the end posts and secure with 3 ties.
7. No more than 24-inches of a 36-inch filter fabric is allowed above ground level.

   Compact the soil immediately next to the filter fabric with the front wheel of the tractor, skid steer, or roller exerting at least 60 pounds per square inch. Compact the upstream side first and then each side twice for a total of four trips. Check and correct the silt fence installation for any deviation before compaction. Use a flat-bladed shovel to tuck fabric deeper into the ground if necessary.

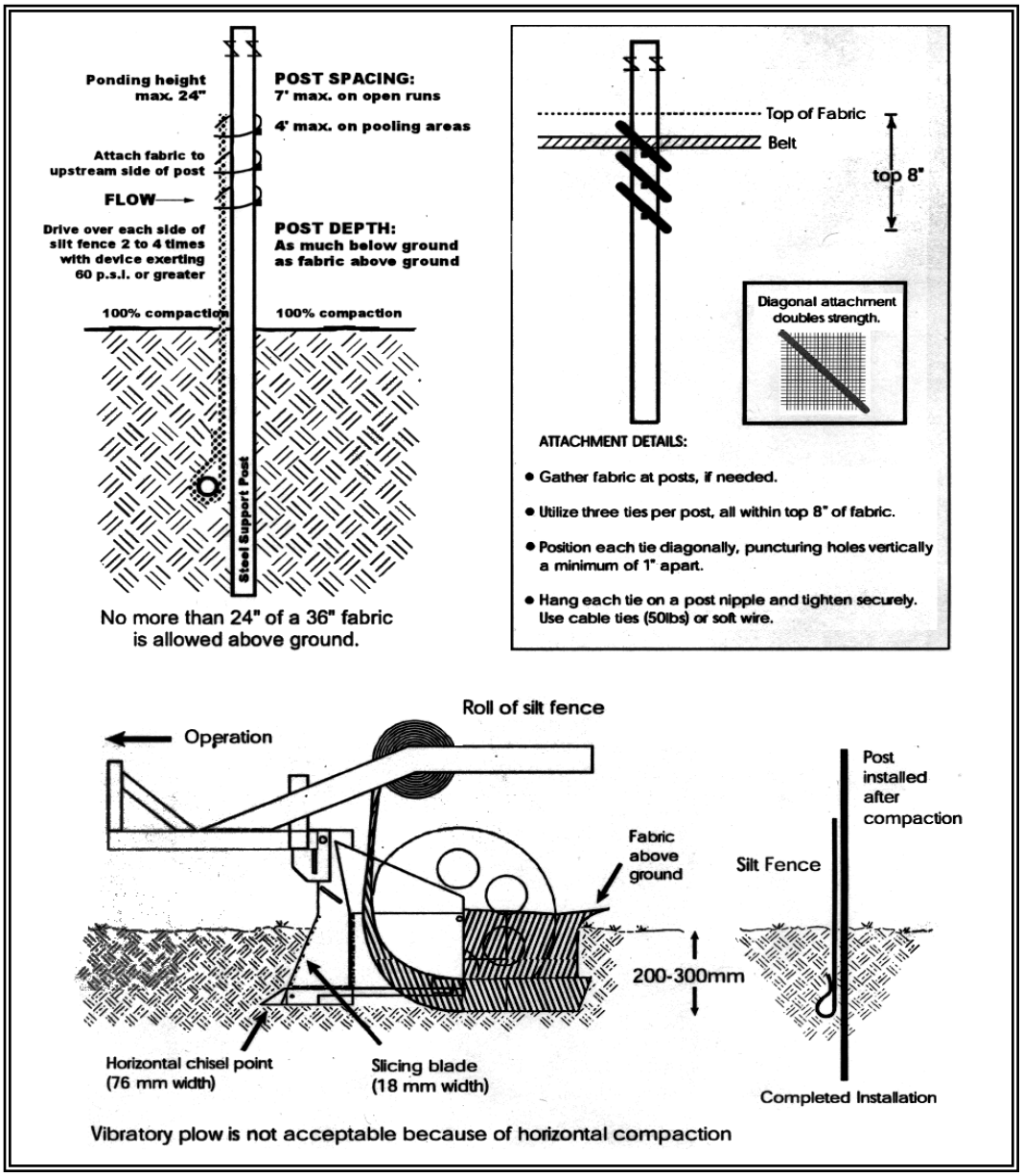


Figure 4.2.13 – Silt Fence Installation by Slicing Method

Maintenance Standards

- Repair any damage immediately.
- Intercept and convey all evident concentrated flows uphill of the silt fence to a sediment pond.
- Check the uphill side of the fence for signs of the fence clogging and acting as a barrier to flow and then causing channelization of flows parallel to the fence. If this occurs, replace the fence or remove the trapped sediment.

- Remove sediment deposits when the deposit reaches approximately one-third the height of the silt fence, or install a second silt fence.
- Replace filter fabric that has deteriorated due to ultraviolet breakdown.

BMP C234: Vegetated Strip

Purpose

Vegetated strips reduce the transport of coarse sediment from a construction site by providing a temporary physical barrier to sediment and reducing the runoff velocities of overland flow.

Conditions of Use

- Vegetated strips may be used downslope of all disturbed areas.
- Vegetated strips are not intended to treat concentrated flows, nor are they intended to treat substantial amounts of overland flow. Any concentrated flows must be conveyed through the drainage system to a sediment pond. The only circumstance in which overland flow can be treated solely by a strip, rather than by a sediment pond, is when the following criteria are met (see Table 4.2.4):

Table 4.2.4
Contributing Drainage Area for Vegetated Strips

Average Contributing area Slope	Average Contributing area Percent Slope	Max Contributing area Flowpath Length
1.5H:1V or flatter	67% or flatter	100 feet
2H:1V or flatter	50% or flatter	115 feet
4H:1V or flatter	25% or flatter	150 feet
6H:1V or flatter	16.7% or flatter	200 feet
10H:1V or flatter	10% or flatter	250 feet

Design and Installation Specifications

- The vegetated strip shall consist of a minimum of a 25-foot flowpath length continuous strip of dense vegetation with topsoil. Grass-covered, landscaped areas are generally not adequate because the volume of sediment overwhelms the grass. Ideally, vegetated strips shall consist of undisturbed native growth with a well-developed soil that allows for infiltration of runoff.
- The slope within the strip shall not exceed 4H:1V.
- The uphill boundary of the vegetated strip shall be delineated with clearing limits.

Maintenance Standards

- Any areas damaged by erosion or construction activity shall be seeded immediately and protected by mulch.
- If more than 5 feet of the original vegetated strip width has had vegetation removed or is being eroded, sod must be installed.
- If there are indications that concentrated flows are traveling across the buffer, surface water controls must be installed to reduce the flows

entering the buffer, or additional perimeter protection must be installed.

BMP C235: Wattles

Purpose

Wattles are temporary erosion and sediment control barriers consisting of straw, compost, or other material that is wrapped in biodegradable tubular plastic or similar encasing material. They reduce the velocity and can spread the flow of rill and sheet runoff, and can capture and retain sediment. Wattles are typically 8 to 10 inches in diameter and 25 to 30 feet in length. Wattles are placed in shallow trenches and staked along the contour of disturbed or newly constructed slopes. See Figure 4.2.14 for typical construction details. WSDOT Standard Plan I-30.30-00 also provides information on Wattles (http://www.wsdot.wa.gov/Design/Standards/Plans.htm#SectionI)

Conditions of Use

- Use wattles:
  - In disturbed areas that require immediate erosion protection.
  - On exposed soils during the period of short construction delays, or over winter months.
  - On slopes requiring stabilization until permanent vegetation can be established.
- The material used dictates the effectiveness period of the wattle. Generally, Wattles are typically effective for one to two seasons.
- Prevent rilling beneath wattles by properly entrenching and abutting wattles together to prevent water from passing between them.

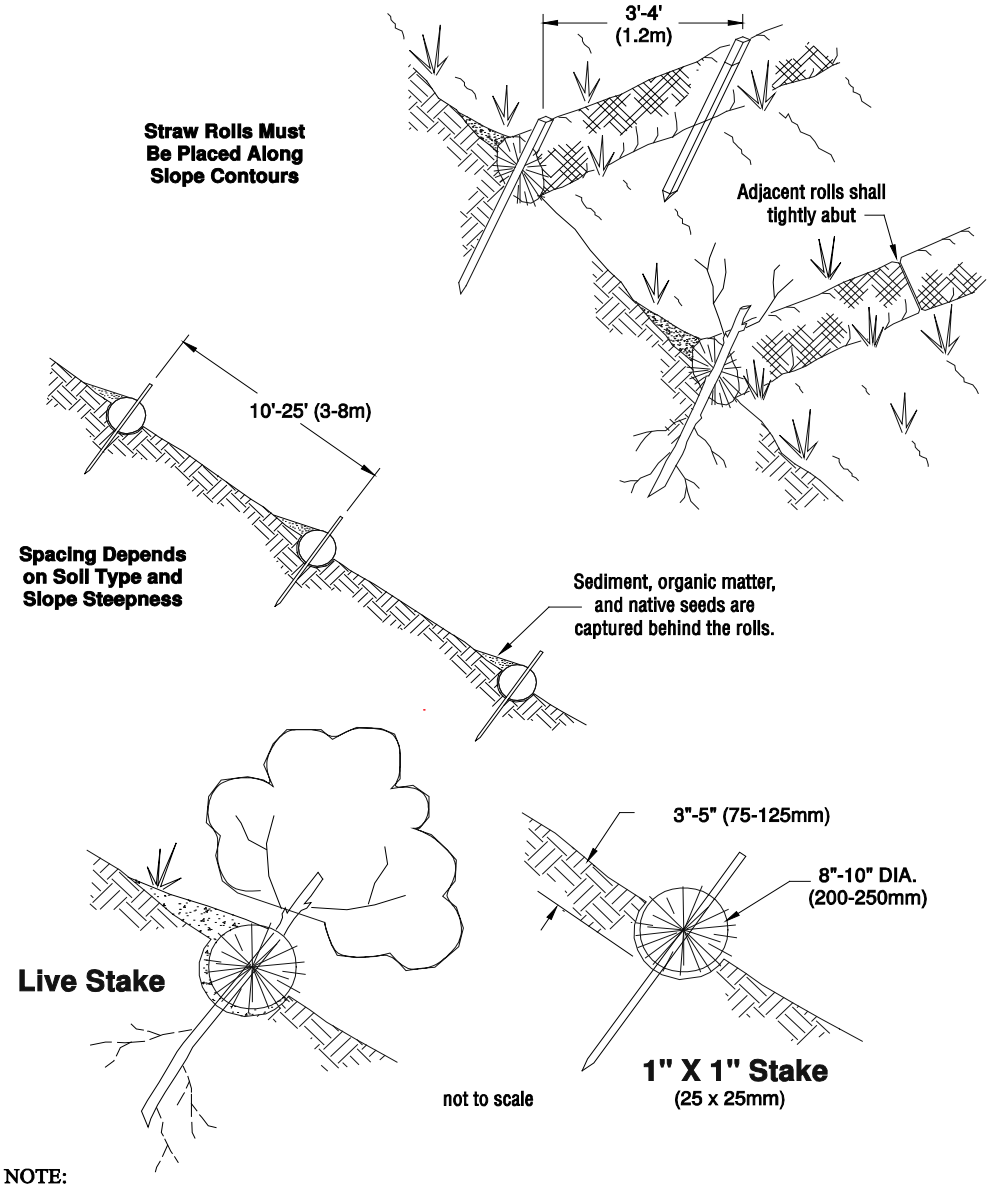
Design Criteria

- Install wattles perpendicular to the flow direction and parallel to the slope contour.
- Narrow trenches should be dug across the slope on contour to a depth of 3- to 5-inches on clay soils and soils with gradual slopes. On loose soils, steep slopes, and areas with high rainfall, the trenches should be dug to a depth of 5- to 7- inches, or 1/2 to 2/3 of the thickness of the wattle.
- Start building trenches and installing wattles from the base of the slope and work up. Spread excavated material evenly along the uphill slope and compacted using hand tamping or other methods.
- Construct trenches at intervals of 10- to 25-feet depending on the steepness of the slope, soil type, and rainfall. The steeper the slope the closer together the trenches.
- Install the wattles snugly into the trenches and abut tightly end to end. Do not overlap the ends.
- Install stakes at each end of the wattle, and at 4-foot centers along entire length of wattle.

- If required, install pilot holes for the stakes using a straight bar to drive holes through the wattle and into the soil.
- Wooden stakes should be approximately 3/4 x 3/4 x 24 inches min. Willow cuttings or 3/8-inch rebar can also be used for stakes.
- Stakes should be driven through the middle of the wattle, leaving 2 to 3 inches of the stake protruding above the wattle.

Maintenance Standards

- Wattles may require maintenance to ensure they are in contact with soil and thoroughly entrenched, especially after significant rainfall on steep sandy soils.



NOTE:
1. Straw roll installation requires the placement and secure staking of the roll in a trench, 3"-5" (75-125mm) deep, dug on contour. runoff must not be allowed to run under or around roll.

Figure 4.2.14 – Wattles

- Inspect the slope after significant storms and repair any areas where wattles are not tightly abutted or water has scoured beneath the wattles.

Approved as Equivalent

Ecology has approved products as able to meet the requirements of BMP C235. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept this product approved as equivalent, or may require additional testing prior to consideration for local use. The products are available for review on Ecology's website at http://www.ecy.wa.gov/programs/wq/stormwater/newtech/equivalent.html

S419 BMPs for Mobile Fueling of Vehicles and Heavy Equipment

Description of Pollutant Sources: Mobile fueling, also known as fleet fueling, wet fueling, or wet hosing, is the practice of filling fuel tanks of vehicles by tank trucks that are driven to the yards or sites where the vehicles to be fueled are located. Regulators categorize diesel fuel as a

Note that some local fire departments may have restrictions on mobile fueling practices.

Class II Combustible Liquid, whereas they categorize gasoline as a Flammable Liquid.

Historically organizations conducted mobile fueling for off-road vehicles operated for extended periods in remote areas. This includes construction sites, logging operations, and farms. Some organizations conduct mobile fueling of on-road vehicles commercially in the State of Washington.

Pollutant Control Approach: Operators typically need proper training of the fueling operators, and the use of spill/drip control and reliable fuel transfer equipment with backup shutoff valving.

Applicable Operational BMPs:

Organizations and individuals conducting mobile fueling operations must implement the bulleted BMPs below. The operating procedures for the driver/operator should be simple, clear, effective, and their implementation verified by the organization liable for environmental and third party damage.

- Ensure that the local fire department approves all mobile fueling operations. Comply with local and Washington State fire codes.
- In fueling locations that are in close proximity to sensitive aquifers, designated wetlands, wetland buffers, or other waters of the State, approval by local jurisdictions is necessary to ensure compliance with additional local requirements.
- Ensure compliance with all 49 CFR 178 requirements for DOT 406 cargo tanker. Documentation from a Department of Transportation (DOT) Registered Inspector provides proof of compliance.
- Ensure the presence and the constant observation/monitoring of the driver/operator at the fuel transfer location at all times during fuel transfer and ensure implementation of the following procedures at the fuel transfer locations:
  - Locate the point of fueling at least 25 feet from the nearest storm sewer or inside an impervious containment with a volumetric holding capacity equal to or greater than 110 percent of the fueling tank volume, or covering the storm sewer to ensure no inflow of spilled or leaked fuel. Covers are not required for storm sewers that convey the inflow to a spill control separator approved by the local jurisdiction and the fire department. Potential spill/leak conveyance surfaces must be impervious and in good repair.
  - Place a drip pan, or an absorbent pad under each fueling location prior to and during all dispensing operations. The pan (must be liquid tight) and the absorbent pad must have a capacity of at least 5 gallons. There is no need to report spills retained in the drip pan or the pad.

  - Manage the handling and operation of fuel transfer hoses and nozzle, drip pan(s), and absorbent pads as needed to prevent spills/leaks of fuel from reaching the ground, storm sewer, and receiving waters.
  - Avoid extending the fueling hoses across a traffic lane without fluorescent traffic cones, or equivalent devices, conspicuously placed to block all traffic from crossing the fuel hose.
  - Remove the fill nozzle and cease filling the tank when the automatic shut-off valve engages. Do not lock automatic shutoff fueling nozzles in the open position.
  - Do not "top off" the fuel receiving equipment.
- Provide the driver/operator of the fueling vehicle with:
  - Adequate flashlights or other mobile lighting to view fuel fill openings with poor accessibility. Consult with local fire department for additional lighting requirements.
  - Two-way communication with his/her home base.
- Train the driver/operator annually in spill prevention and cleanup measures and emergency procedures. Make all employees aware of the significant liability associated with fuel spills.
- The responsible manager shall properly sign and date the fueling operating procedures. Distribute procedures to the operators, retain them in the organization files, and make them available in the event an authorized government agency requests a review.
- Immediately notify the local fire department (911) and the appropriate regional office of Ecology in the event of any spill entering surface or ground waters. Establish a "call down list" to ensure the rapid and proper notification of management and government officials should any significant amount of product be lost off-site. Keep the list in a protected but readily accessible location in the mobile fueling truck. The "call down list" should also pre-identify spill response contractors available in the area to ensure the rapid removal of significant product spillage into the environment.
- Maintain a minimum of the following spill clean-up materials in all fueling vehicles, that are readily available for use:
  - Non-water absorbents capable of absorbing at least15 gallons of diesel fuel.
  - A storm drain plug or cover kit.
  - A non-water absorbent containment boom of a minimum 10 feet in length with a 12-gallon minimum absorbent capacity.
  - A non-spark generating shovel (a steel shovels could generate a spark and cause an explosion in the right environment around a spill).

  - Two, five-gallon buckets with lids.
- Use automatic shutoff nozzles for dispensing the fuel. Replace automatic shut-off nozzles as recommended by the manufacturer.
- Maintain and replace equipment on fueling vehicles, particularly hoses and nozzles, at established intervals to prevent failures.

Applicable Structural Source Control BMPs: Include the following fuel transfer site components:

- Automatic fuel transfer shut-off nozzles.
- An adequate lighting system at the filling point.

S420 BMPs for Painting/ Finishing /Coating of Vehicles/Boats/ Buildings/ Equipment

Description of Pollutant Sources: Surface preparation and the application of paints, finishes, and/or coatings to vehicles, boats, buildings, and/or equipment outdoors can be sources of pollutants. Potential pollutants include organic compounds, oils and greases, heavy metals, and suspended solids.

Pollutant Control Approach: Cover and contain painting and sanding operations and apply good housekeeping and preventive maintenance practices to prevent the contamination of stormwater with painting over sprays and grit from sanding.

Applicable Operational BMPs:

- Train employees in the careful application of paints, finishes, and coatings to reduce misuse and over spray. Use drop cloths underneath outdoor painting, scraping, sandblasting work, and properly clean and temporarily store collected debris daily.
- Do not conduct spraying, blasting, or sanding activities over open water or where wind may blow paint into water.
- Wipe up spills with rags and other absorbent materials immediately. Do not hose down the area to a storm sewer, receiving water, or conveyance ditch.
- On marine dock areas sweep rather than hose down debris. Collect any hose water generated and convey to appropriate treatment and disposal.
- Use an effective runoff control device if dust, grit, washwater, or other pollutants may escape the work area and enter a catch basin. The containment device(s) must be in place at the beginning of the workday. Collect contaminated runoff and solids and properly dispose of such wastes before removing the containment device(s) at the end of the workday.

S425 BMPs for Soil Erosion and Sediment Control at Industrial Sites

Description of Pollutant Sources: Industrial activities on soil areas; exposed and disturbed soils; steep grading; etc. can be sources of sediments that can contaminate stormwater runoff.

Pollutant Control Approach: Limit the exposure of erodible soil, stabilize, or cover erodible soil where necessary to prevent erosion, and/or provide treatment for stormwater contaminated with TSS caused by eroded soil.

Applicable BMPs:

Cover Practice Options:

- Vegetative cover such as grass, trees, shrubs, on erodible soil areas.
- Covering with mats such as clear plastic, jute, synthetic fiber.
- Preservation of natural vegetation including grass, trees, shrubs, and vines.

Structural Practice Options:

- Vegetated swale
- Dike
- Silt fence
- Check dam
- Gravel filter berm
- Sedimentation basin
- Proper grading.

(For design information refer to Volume II, "Standards and Specifications for BMPs").

S426 BMPs for Spills of Oil and Hazardous Substances

Description of Pollutant Sources: Federal law requires owners or operators of facilities engaged in drilling, producing, gathering, storing, processing, transferring, distributing, refining, or consuming oil and/or oil products to have a Spill Prevention and Emergency Cleanup Plan (SPECP). The SPECP is required if the above ground storage capacity of the facility, is 1,320 gallons or more of oil. Additionally, the SPECP is required if any single container with a capacity in excess of 660 gallons and which, due to their location, could reasonably be expected to discharge oil in harmful quantities, as defined in 40 CFR Part 110, into or upon the navigable waters of the United States or adjoining shorelines {40 CFR 112.1 (b)}. Onshore and offshore facilities, which, due to their location, could not reasonably be expected to discharge oil into or upon

the navigable waters of the United States or adjoining shorelines are exempt from these regulations {40 CFR 112.1(1)(i)}. State Law requires owners of businesses that produce dangerous wastes to have a SPECP. These businesses should refer to Appendix IV-D R.6. The federal definition of oil is oil of any kind or any form, including, but not limited to petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged spoil.

Pollutant Control Approach: Maintain, update, and implement a Spill Prevention and Emergency Cleanup Plan.

Applicable Operational BMPs: The businesses and public agencies identified in Appendix IV-A required to prepare and implement a Spill Prevention and Emergency Cleanup Plan shall implement the following:

- Prepare a Spill Prevention and Emergency Cleanup Plan (SPECP), which includes:
  - A description of the facility including the owner's name and address.
  - The nature of the activity at the facility.
  - The general types of chemicals used or stored at the facility.
  - A site plan showing the location of storage areas for chemicals, the locations of storm drains, the areas draining to them, and the location and description of any devices to stop spills from leaving the site such as positive control valves.
  - Cleanup procedures.
  - Notification procedures used in the event of a spill, such as notifying key personnel. Agencies such as Ecology, local fire department, Washington State Patrol, and the local Sewer Authority, shall be notified.
  - The name of the designated person with overall spill cleanup and notification responsibility.
- Train key personnel in the implementation of the SPECP. Prepare a summary of the plan and post it at appropriate points in the building, identifying the spill cleanup coordinators, location of cleanup kits, and phone numbers of regulatory agencies to contact in the event of a spill.
- Update the SPECP regularly.
- Immediately notify Ecology, the local jurisdiction, and the local Sewer Authority if a spill may reach sanitary or storm sewers, ground water, or surface water, in accordance with federal and Ecology spill reporting requirements.

- Immediately clean up spills. Do not use emulsifiers for cleanup unless there is an appropriate disposal method for the resulting oily wastewater. Do not wash absorbent material down a floor drain or into a storm sewer.
- Locate emergency spill containment and cleanup kit(s) in high-potential spill areas. The contents of the kit shall be appropriate for the type and quantities of chemical liquids stored at the facility.

Recommended Additional Operational BMP: Spill kits should include appropriately lined drums, absorbent pads, and granular or powdered materials for neutralizing acids or alkaline liquids where applicable. In fueling areas: Package absorbent material in small bags for easy use and make available small drums for storage of absorbent and/or used absorbent. Deploy spill kits in a manner that allows rapid access and use by employees.

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Appendix C - Site Inspection Form

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Construction Stormwater Site Inspection Form

Project Name _____ Permit # _____ Inspection Date _____ Time _____

Name of Certified Erosion Sediment Control Lead (CESCL) or qualified inspector if *less than one acre*
Print Name: _____

Approximate rainfall amount since the last inspection (in inches): _____

Approximate rainfall amount in the last 24 hours (in inches): _____

Current Weather Clear ☐ Cloudy ☐ Mist ☐ Rain ☐ Wind ☐ Fog ☐

A. Type of inspection: Weekly ☐ Post Storm Event ☐ Other ☐

B. Phase of Active Construction (*check all that apply*):

Pre Construction/installation of erosion/sediment controls	☐	Clearing/Demo/Grading	☐	Infrastructure/storm/roads	☐
Concrete pours	☐	Vertical Construction/buildings	☐	Utilities	☐
Offsite improvements	☐	Site temporary stabilized	☐	Final stabilization	☐

C. Questions:

1. Were all areas of construction and discharge points inspected? Yes ___ No ___
2. Did you observe the presence of suspended sediment, turbidity, discoloration, or oil sheen Yes ___ No ___
3. Was a water quality sample taken during inspection? (*refer to permit conditions S4 & S5*) Yes ___ No ___
4. Was there a turbid discharge 250 NTU or greater, or Transparency 6 cm or less?* Yes ___ No ___
5. If yes to #4 was it reported to Ecology? Yes ___ No ___
6. Is pH sampling required? pH range required is 6.5 to 8.5. Yes ___ No ___

If answering yes to a discharge, describe the event. Include when, where, and why it happened; what action was taken, and when.

_____

_____

_____

_____

*If answering yes to # 4 record NTU/Transparency with continual sampling daily until turbidity is 25 NTU or less/ transparency is 33 cm or greater.

Sampling Results: Date: _____

Parameter	Method (circle one)	Result			Other/Note
		NTU	cm	pH	
Turbidity	tube, meter, laboratory				
pH	Paper, kit, meter				

Construction Stormwater Site Inspection Form

D. Check the observed status of all items. Provide "Action Required "details and dates.

Element #	Inspection	BMPs Inspected			BMP needs maintenance	BMP failed	Action required (describe in section F)
		yes	no	n/a			
1 Clearing Limits	Before beginning land disturbing activities are all clearing limits, natural resource areas (streams, wetlands, buffers, trees) protected with barriers or similar BMPs? (high visibility recommended)						
2 Construction Access	Construction access is stabilized with quarry spalls or equivalent BMP to prevent sediment from being tracked onto roads?						
	Sediment tracked onto the road way was cleaned thoroughly at the end of the day or more frequent as necessary.						
3 Control Flow Rates	Are flow control measures installed to control stormwater volumes and velocity during construction and do they protect downstream properties and waterways from erosion?						
	If permanent infiltration ponds are used for flow control during construction, are they protected from siltation?						
4 Sediment Controls	All perimeter sediment controls (e.g. silt fence, wattles, compost socks, berms, etc.) installed, and maintained in accordance with the Stormwater Pollution Prevention Plan (SWPPP).						
	Sediment control BMPs (sediment ponds, traps, filters etc.) have been constructed and functional as the first step of grading.						
	Stormwater runoff from disturbed areas is directed to sediment removal BMP.						
5 Stabilize Soils	Have exposed un-worked soils been stabilized with effective BMP to prevent erosion and sediment deposition?						

Construction Stormwater Site Inspection Form

Element #	Inspection	BMPs Inspected			BMP needs maintenance	BMP failed	Action required (describe in section F)
		yes	no	n/a			
5 Stabilize Soils Cont.	Are stockpiles stabilized from erosion, protected with sediment trapping measures and located away from drain inlet, waterways, and drainage channels?						
	Have soils been stabilized at the end of the shift, before a holiday or weekend if needed based on the weather forecast?						
6 Protect Slopes	Has stormwater and ground water been diverted away from slopes and disturbed areas with interceptor dikes, pipes and or swales?						
	Is off-site storm water managed separately from stormwater generated on the site?						
	Is excavated material placed on uphill side of trenches consistent with safety and space considerations?						
	Have check dams been placed at regular intervals within constructed channels that are cut down a slope?						
7 Drain Inlets	Storm drain inlets made operable during construction are protected.						
	Are existing storm drains within the influence of the project protected?						
8 Stabilize Channel and Outlets	Have all on-site conveyance channels been designed, constructed and stabilized to prevent erosion from expected peak flows?						
	Is stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent stream banks, slopes and downstream conveyance systems?						
9 Control Pollutants	Are waste materials and demolition debris handled and disposed of to prevent contamination of stormwater?						
	Has cover been provided for all chemicals, liquid products, petroleum products, and other material?						
	Has secondary containment been provided capable of containing 110% of the volume?						
	Were contaminated surfaces cleaned immediately after a spill incident?						
	Were BMPs used to prevent contamination of stormwater by a pH modifying sources?						

Construction Stormwater Site Inspection Form

Element #	Inspection	BMPs Inspected			BMP needs maintenance	BMP failed	Action required (describe in section F)
		yes	no	n/a			
9 Cont.	Wheel wash wastewater is handled and disposed of properly.						
10 Control Dewatering	Concrete washout in designated areas. No washout or excess concrete on the ground.						
	Dewatering has been done to an approved source and in compliance with the SWPPP.						
	Were there any clean non turbid dewatering discharges?						
11 Maintain BMP	Are all temporary and permanent erosion and sediment control BMPs maintained to perform as intended?						
12 Manage the Project	Has the project been phased to the maximum degree practicable?						
	Has regular inspection, monitoring and maintenance been performed as required by the permit?						
	Has the SWPPP been updated, implemented and records maintained?						
13 Protect LID	Is all Bioretention and Rain Garden Facilities protected from sedimentation with appropriate BMPs?						
	Is the Bioretention and Rain Garden protected against over compaction of construction equipment and foot traffic to retain its infiltration capabilities?						
	Permeable pavements are clean and free of sediment and sediment laden-water runoff. Muddy construction equipment has not been on the base material or pavement.						
	Have soiled permeable pavements been cleaned of sediments and pass infiltration test as required by stormwater manual methodology?						
	Heavy equipment has been kept off existing soils under LID facilities to retain infiltration rate.						

E. Check all areas that have been inspected. ✔

All in place BMPs ☐ All disturbed soils ☐ All concrete wash out area ☐ All material storage areas ☐
All discharge locations ☐ All equipment storage areas ☐ All construction entrances/exits ☐

F. Elements checked "Action Required" (section D) describe corrective action to be taken. List the element number; be specific on location and work needed. Document, initial, and date when the corrective action has been completed and inspected.

Element #	Description and Location	Action Required	Completion Date	Initials

Attach additional page if needed

Sign the following certification:

"I certify that this report is true, accurate, and complete, to the best of my knowledge and belief"

Inspected by: (print) _____ (Signature) _____ Date: _____

Title/Qualification of Inspector: _____

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Appendix D - Construction Stormwater General Permit (CSWGP)

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Issuance Date: November 18, 2020
Effective Date: January 1, 2021
Expiration Date: December 31, 2025

CONSTRUCTION STORMWATER GENERAL PERMIT

National Pollutant Discharge Elimination System (NPDES) and State Waste Discharge General Permit for Stormwater Discharges Associated with Construction Activity

State of Washington
Department of Ecology
Olympia, Washington 98504

In compliance with the provisions of
Chapter 90.48 Revised Code of Washington
(State of Washington Water Pollution Control Act)
and
Title 33 United States Code, Section 1251 et seq.
The Federal Water Pollution Control Act (The Clean Water Act)

Until this permit expires, is modified, or revoked, Permittees that have properly obtained coverage under this general permit are authorized to discharge in accordance with the special and general conditions that follow.

Vincent McGowan, P.E.
Water Quality Program Manager
Washington State Department of Ecology

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LIST OF TABLES

SUMMARY OF PERMIT REPORT SUBMITTALS

Refer to the Special and General Conditions within this permit for additional submittal requirements. Appendix A provides a list of definitions. Appendix B provides a list of acronyms.

Table 1 Summary of Required Submittals

Permit Section	Submittal	Frequency	First Submittal Date
S5.A and S8	High Turbidity/Transparency Phone Reporting	As Necessary	Within 24 hours
S5.B	Discharge Monitoring Report	Monthly*	Within 15 days following the end of each month
S5.F and S8	Noncompliance Notification – Telephone Notification	As necessary	Within 24 hours
S5.F	Noncompliance Notification – Written Report	As necessary	Within 5 Days of non-compliance
S9.D	Request for Chemical Treatment Form	As necessary	Written approval from Ecology is required prior to using chemical treatment (with the exception of dry ice, CO_2 or food grade vinegar to adjust pH)
G2	Notice of Change in Authorization	As necessary	
G6	Permit Application for Substantive Changes to the Discharge	As necessary	
G8	Application for Permit Renewal	1/permit cycle	No later than 180 days before expiration
S2.A	Notice of Permit Transfer	As necessary	
G19	Notice of Planned Changes	As necessary	
G21	Reporting Anticipated Non-compliance	As necessary	

NOTE: *Permittees must submit electronic Discharge Monitoring Reports (DMRs) to the Washington State Department of Ecology monthly, regardless of site discharge, for the full duration of permit coverage. Refer to Section S5.B of this General Permit for more specific information regarding DMRs.

Table 2 Summary of Required On-site Documentation

Document Title	Permit Conditions
Permit Coverage Letter	See Conditions S2, S5
Construction Stormwater General Permit (CSWGP)	See Conditions S2, S5
Site Log Book	See Conditions S4, S5
Stormwater Pollution Prevention Plan (SWPPP)	See Conditions S5, S9
Site Map	See Conditions S5, S9

SPECIAL CONDITIONS

S1. PERMIT COVERAGE

A. Permit Area

This Construction Stormwater General Permit (CSWGP) covers all areas of Washington State, except for federal operators and Indian Country as specified in Special Condition S1.E.3 and 4.

B. Operators Required to Seek Coverage Under this General Permit

1. Operators of the following construction activities are required to seek coverage under this CSWGP:

    a. Clearing, grading and/or excavation that results in the disturbance of one or more acres (including off-site disturbance acreage related to construction-support activity as authorized in S1.C.2) and discharges stormwater to surface waters of the State; and clearing, grading and/or excavation on sites smaller than one acre that are part of a larger common plan of development or sale, if the common plan of development or sale will ultimately disturb one acre or more and discharge stormwater to surface waters of the State.

        i. This category includes forest practices (including, but not limited to, class IV conversions) that are part of a construction activity that will result in the disturbance of one or more acres, and discharge to surface waters of the State (that is, forest practices that prepare a site for construction activities); and

    b. Any size construction activity discharging stormwater to waters of the State that the Washington State Department of Ecology (Ecology):

        i. Determines to be a significant contributor of pollutants to waters of the State of Washington.

        ii. Reasonably expects to cause a violation of any water quality standard.

2. Operators of the following activities are not required to seek coverage under this CSWGP (unless specifically required under Special Condition S1.B.1.b, above):

    a. Construction activities that discharge all stormwater and non-stormwater to groundwater, sanitary sewer, or combined sewer, and have no point source discharge to either surface water or a storm sewer system that drains to surface waters of the State.

    b. Construction activities covered under an Erosivity Waiver (Special Condition S1.F).

    c. Routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility.

C. Authorized Discharges

1. ***Stormwater Associated with Construction Activity.*** Subject to compliance with the terms and conditions of this permit, Permittees are authorized to discharge stormwater associated with construction activity to surface waters of the State or to a storm sewer system that drains to surface waters of the State. (Note that "surface waters of the

State" may exist on a construction site as well as off site; for example, a creek running through a site.)

2. ***Stormwater Associated with Construction Support Activity.*** This permit also authorizes stormwater discharge from support activities related to the permitted construction site (for example, an on-site portable rock crusher, off-site equipment staging yards, material storage areas, borrow areas, etc.) provided:

    a. The support activity relates directly to the permitted construction site that is required to have an NPDES permit; and

    b. The support activity is not a commercial operation serving multiple unrelated construction projects, and does not operate beyond the completion of the construction activity; and

    c. Appropriate controls and measures are identified in the Stormwater Pollution Prevention Plan (SWPPP) for the discharges from the support activity areas.

3. ***Non-Stormwater Discharges.*** The categories and sources of non-stormwater discharges identified below are authorized conditionally, provided the discharge is consistent with the terms and conditions of this permit:

    a. Discharges from fire-fighting activities.

    b. Fire hydrant system flushing.

    c. Potable water, including uncontaminated water line flushing.

    d. Hydrostatic test water.

    e. Uncontaminated air conditioning or compressor condensate.

    f. Uncontaminated groundwater or spring water.

    g. Uncontaminated excavation dewatering water (in accordance with S9.D.10).

    h. Uncontaminated discharges from foundation or footing drains.

    i. Uncontaminated or potable water used to control dust. Permittees must minimize the amount of dust control water used.

    j. Routine external building wash down that does not use detergents.

    k. Landscape irrigation water.

The SWPPP must adequately address all authorized non-stormwater discharges, except for discharges from fire-fighting activities, and must comply with Special Condition S3. At a minimum, discharges from potable water (including water line flushing), fire hydrant system flushing, and pipeline hydrostatic test water must undergo the following: dechlorination to a concentration of 0.1 parts per million (ppm) or less, and pH adjustment to within 6.5 – 8.5 standard units (su), if necessary.

D. Prohibited Discharges

The following discharges to waters of the State, including groundwater, are prohibited:

1. Concrete wastewater

2. Wastewater from washout and clean-up of stucco, paint, form release oils, curing compounds and other construction materials.

3. Process wastewater as defined by 40 Code of Federal Regulations (CFR) 122.2 (See Appendix A of this permit).

4. Slurry materials and waste from shaft drilling, including process wastewater from shaft drilling for construction of building, road, and bridge foundations unless managed according to Special Condition S9.D.9.j.

5. Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance.

6. Soaps or solvents used in vehicle and equipment washing.

7. Wheel wash wastewater, unless managed according to Special Condition S9.D.9.

8. Discharges from dewatering activities, including discharges from dewatering of trenches and excavations, unless managed according to Special Condition S9.D.10.

E. Limits on Coverage

Ecology may require any discharger to apply for and obtain coverage under an individual permit or another more specific general permit. Such alternative coverage will be required when Ecology determines that this CSWGP does not provide adequate assurance that water quality will be protected, or there is a reasonable potential for the project to cause or contribute to a violation of water quality standards.

The following stormwater discharges are not covered by this permit:

1. Post-construction stormwater discharges that originate from the site after completion of construction activities and the site has undergone final stabilization.

2. Non-point source silvicultural activities such as nursery operations, site preparation, reforestation and subsequent cultural treatment, thinning, prescribed burning, pest and fire control, harvesting operations, surface drainage, or road construction and maintenance, from which there is natural runoff as excluded in 40 CFR Subpart 122.

3. Stormwater from any federal operator.

4. Stormwater from facilities located on ***Indian Country*** as defined in 18 U.S.C.§1151, except portions of the Puyallup Reservation as noted below.

   Indian Country includes:

   a. All land within any Indian Reservation notwithstanding the issuance of any patent, and, including rights-of-way running through the reservation. This includes all federal, tribal, and Indian and non-Indian privately owned land within the reservation.

   b. All off-reservation Indian allotments, the Indian titles to which have not been extinguished, including rights-of-way running through the same.

   c. All off-reservation federal trust lands held for Native American Tribes.

Puyallup Exception: Following the *Puyallup Tribes of Indians Land Settlement Act of 1989*, 25 U.S.C. §1773; the permit does apply to land within the Puyallup Reservation except for discharges to surface water on land held in trust by the federal government.

5. Stormwater from any site covered under an existing NPDES individual permit in which stormwater management and/or treatment requirements are included for all stormwater discharges associated with construction activity.

6. Stormwater from a site where an applicable Total Maximum Daily Load (TMDL) requirement specifically precludes or prohibits discharges from construction activity.

F. Erosivity Waiver

Construction site operators may qualify for an Erosivity Waiver from the CSWGP if the following conditions are met:

1. The site will result in the disturbance of fewer than five (5) acres and the site is not a portion of a common plan of development or sale that will disturb five (5) acres or greater.

2. Calculation of Erosivity "R" Factor and Regional Timeframe:

    a. The project's calculated rainfall erosivity factor ("R" Factor) must be less than five (5) during the period of construction activity, (See the CSWGP homepage http://www.ecy.wa.gov/programs/wq/stormwater/construction/index.html for a link to the EPA's calculator and step by step instructions on computing the "R" Factor in the *EPA Erosivity Waiver Fact Sheet*). The period of construction activity starts when the land is first disturbed and ends with final stabilization. In addition:

    b. The entire period of construction activity must fall within the following timeframes:

        i. For sites west of the Cascades Crest: June 15 – September 15.

        ii. For sites east of the Cascades Crest, excluding the Central Basin: June 15 – October 15.

        iii. For sites east of the Cascades Crest, within the Central Basin: no timeframe restrictions apply. The Central Basin is defined as the portions of Eastern Washington with mean annual precipitation of less than 12 inches. For a map of the Central Basin (Average Annual Precipitation Region 2), refer to: http://www.ecy.wa.gov/programs/wq/stormwater/construction/resourcesguidance.html.

3. Construction site operators must submit a complete Erosivity Waiver certification form at least one week before disturbing the land. Certification must include statements that the operator will:

    a. Comply with applicable local stormwater requirements; and

    b. Implement appropriate erosion and sediment control BMPs to prevent violations of water quality standards.

4. This waiver is not available for facilities declared significant contributors of pollutants as defined in Special Condition S1.B.1.b or for any size construction activity that could

reasonably expect to cause a violation of any water quality standard as defined in Special Condition S1.B.1.b.ii.

5. This waiver does not apply to construction activities which include non-stormwater discharges listed in Special Condition S1.C.3.

6. If construction activity extends beyond the certified waiver period for any reason, the operator must either:

   a. Recalculate the rainfall erosivity "R" factor using the original start date and a new projected ending date and, if the "R" factor is still under 5 *and* the entire project falls within the applicable regional timeframe in Special Condition S1.F.2.b, complete and submit an amended waiver certification form before the original waiver expires; *or*

   b. Submit a complete permit application to Ecology in accordance with Special Condition S2.A and B before the end of the certified waiver period.

S2. APPLICATION REQUIREMENTS

A. Permit Application Forms

1. *Notice of Intent Form*

a. Operators of new or previously unpermitted construction activities must submit a complete and accurate permit application (Notice of Intent, or NOI) to Ecology.

b. Operators must apply using the electronic application form (NOI) available on Ecology's website (http://ecy.wa.gov/programs/wq/stormwater/construction/index.html). Permittees unable to submit electronically (for example, those who do not have an internet connection) must contact Ecology to request a waiver and obtain instructions on how to obtain a paper NOI.

Department of Ecology
Water Quality Program - Construction Stormwater
PO Box 47696
Olympia, Washington 98504-7696

c. The operator must submit the NOI at least 60 days before discharging stormwater from construction activities and must submit it prior to the date of the first public notice (See Special Condition S2.B, below, for details). The 30-day public comment period begins on the publication date of the second public notice. Unless Ecology responds to the complete application in writing, coverage under the general permit will automatically commence on the 31st day following receipt by Ecology of a *completed* NOI, or the issuance date of this permit, whichever is later; unless Ecology specifies a later date in writing as required by WAC173-226-200(2). See S8.B for Limits on Coverage for New Discharges to TMDL or 303(d)-Listed Waters.

d. If an applicant intends to use a Best Management Practice (BMP) selected on the basis of Special Condition S9.C.4 ("demonstrably equivalent" BMPs), the applicant must notify Ecology of its selection as part of the NOI. In the event the applicant selects BMPs after submission of the NOI, the applicant must provide notice of the

selection of an equivalent BMP to Ecology at least 60 days before intended use of the equivalent BMP.

e. Applicants must notify Ecology if they are aware of contaminated soils and/or groundwater associated with the construction activity. Provide detailed information with the NOI (as known and readily available) on the nature and extent of the contamination (concentrations, locations, and depth), as well as pollution prevention and/or treatment BMPs proposed to control the discharge of soil and/or groundwater contaminants in stormwater. Examples of such detail may include, but are not limited to:

   i. List or table of all known contaminants with laboratory test results showing concentration and depth,

   ii. Map with sample locations,

   iii. Related portions of the Stormwater Pollution Prevention Plan (SWPPP) that address the management of contaminated and potentially contaminated construction stormwater and dewatering water,

   iv. Dewatering plan and/or dewatering contingency plan.

2. ***Transfer of Coverage Form***

The Permittee can transfer current coverage under this permit to one or more new operators, including operators of sites within a Common Plan of Development, provided:

   i. The Permittee submits a complete Transfer of Coverage Form to Ecology, signed by the current and new discharger and containing a specific date for transfer of permit responsibility, coverage and liability (including any Administrative Orders associated with the permit); and

   ii. Ecology does not notify the current discharger and new discharger of intent to revoke coverage under the general permit. If this notice is not given, the transfer is effective on the date specified in the written agreement.

When a current discharger (Permittee) transfers a portion of a permitted site, the current discharger must also indicate the remaining permitted acreage after the transfer. Transfers do not require public notice.

3. ***Modification of Coverage Form***

Permittees must notify Ecology regarding any changes to the information provided on the NOI by submitting an Update/Modification of Permit Coverage form in accordance with General Conditions G6 and G19. Examples of such changes include, but are not limited to:

   i. Changes to the Permittee's mailing address,

   ii. Changes to the on-site contact person information, and

   iii. Changes to the area/acreage affected by construction activity.

B. Public Notice

For new or previously unpermitted construction activities, the applicant must publish a public notice at least one time each week for two consecutive weeks, at least 7 days apart, in a newspaper with general circulation in the county where the construction is to take place. The notice must be run after the NOI has been submitted and must contain:

1. A statement that "*The applicant is seeking coverage under the Washington State Department of Ecology's Construction Stormwater NPDES and State Waste Discharge General Permit*."
2. The name, address, and location of the construction site.
3. The name and address of the applicant.
4. The type of construction activity that will result in a discharge (for example, residential construction, commercial construction, etc.), and the total number of acres to be disturbed over the lifetime of the project.
5. The name of the receiving water(s) (that is, the surface water(s) to which the site will discharge), or, if the discharge is through a storm sewer system, the name of the operator of the system and the receiving water(s) the system discharges to.
6. The statement: *Any persons desiring to present their views to the Washington State Department of Ecology regarding this application, or interested in Ecology's action on this application, may notify Ecology in writing no later than 30 days of the last date of publication of this notice. Ecology reviews public comments and considers whether discharges from this project would cause a measurable change in receiving water quality, and, if so, whether the project is necessary and in the overriding public interest according to Tier II antidegradation requirements under WAC 173-201A-320. Comments can be submitted to: Department of Ecology, PO Box 47696, Olympia, Washington 98504-7696 Attn: Water Quality Program, Construction Stormwater*.

S3. COMPLIANCE WITH STANDARDS

A. Discharges must not cause or contribute to a violation of surface water quality standards (Chapter 173-201A WAC), groundwater quality standards (Chapter 173-200 WAC), sediment management standards (Chapter 173-204 WAC), and human health-based criteria in the Federal water quality criteria applicable to Washington. (40 CFR Part 131.45) Discharges that are not in compliance with these standards are prohibited.

B. Prior to the discharge of stormwater and non-stormwater to waters of the State, the Permittee must apply All Known, Available, and Reasonable methods of prevention, control, and Treatment (AKART). This includes the preparation and implementation of an adequate SWPPP, with all appropriate BMPs installed and maintained in accordance with the SWPPP and the terms and conditions of this permit.

C. Ecology presumes that a Permittee complies with water quality standards unless discharge monitoring data or other site-specific information demonstrates that a discharge causes or contributes to a violation of water quality standards, when the Permittee complies with the following conditions. The Permittee must fully:

1. Comply with all permit conditions, including; planning, sampling, monitoring, reporting, and recordkeeping conditions.

2. Implement stormwater BMPs contained in stormwater management manuals published or approved by Ecology, or BMPs that are demonstrably equivalent to BMPs contained in stormwater management manuals published or approved by Ecology, including the proper selection, implementation, and maintenance of all applicable and appropriate BMPs for on-site pollution control. (For purposes of this section, the stormwater manuals listed in Appendix 10 of the *Phase I Municipal Stormwater Permit* are approved by Ecology.)

D. Where construction sites also discharge to groundwater, the groundwater discharges must also meet the terms and conditions of this CSWGP. Permittees who discharge to groundwater through an injection well must also comply with any applicable requirements of the Underground Injection Control (UIC) regulations, Chapter 173-218 WAC.

S4. MONITORING REQUIREMENTS, BENCHMARKS, AND REPORTING TRIGGERS

A. Site Log Book

The Permittee must maintain a site log book that contains a record of the implementation of the SWPPP and other permit requirements, including the installation and maintenance of BMPs, site inspections, and stormwater monitoring.

B. Site Inspections

Construction sites one (1) acre or larger that discharge stormwater to surface waters of the State must have site inspections conducted by a Certified Erosion and Sediment Control Lead (CESCL). Sites less than one (1) acre may have a person without CESCL certification conduct inspections. (See Special Conditions S4.B.3 and B.4, below, for detailed requirements of the Permittee's CESCL.)

Site inspections must include all areas disturbed by construction activities, all BMPs, and all stormwater discharge points under the Permittee's operational control.

1. The Permittee must have staff knowledgeable in the principles and practices of erosion and sediment control. The CESCL (sites one acre or more) or inspector (sites less than one acre) must have the skills to assess the:

    a. Site conditions and construction activities that could impact the quality of stormwater; and

    b. Effectiveness of erosion and sediment control measures used to control the quality of stormwater discharges. The SWPPP must identify the CESCL or inspector, who must be present on site or on-call at all times. The CESCL (sites one (1) acre or more) must obtain this certification through an approved erosion and sediment control training program that meets the minimum training standards established by Ecology. (See BMP C160 in the manual, referred to in Special Condition S9.C.1 and 2.)

2. The CESCL or inspector must examine stormwater visually for the presence of suspended sediment, turbidity, discoloration, and oil sheen. BMP effectiveness must be evaluated to

determine if it is necessary to install, maintain, or repair BMPs to improve the quality of stormwater discharges.

Based on the results of the inspection, the Permittee must correct the problems identified, by:

a. Reviewing the SWPPP for compliance with Special Condition S9 and making appropriate revisions within 7 days of the inspection.

b. Immediately beginning the process of fully implementing and maintaining appropriate source control and/or treatment BMPs, within 10 days of the inspection. If installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when an extension is requested by a Permittee within the initial 10-day response period.

c. Documenting BMP implementation and maintenance in the site log book.

3. The CESCL or inspector must inspect all areas disturbed by construction activities, all BMPs, and all stormwater discharge points at least once every calendar week and within 24 hours of any discharge from the site. (For purposes of this condition, individual discharge events that last more than one (1) day do not require daily inspections. For example, if a stormwater pond discharges continuously over the course of a week, only one (1) inspection is required that week.) Inspection frequency may be reduced to once every calendar month for inactive sites that are temporarily stabilized.

4. The Permittee must summarize the results of each inspection in an inspection report or checklist and enter the report/checklist into, or attach it to, the site log book. At a minimum, each inspection report or checklist must include:

   a. Inspection date and time.

   b. Weather information.

   c. The general conditions during inspection.

   d. The approximate amount of precipitation since the last inspection.

   e. The approximate amount of precipitation within the last 24 hours.

   f. A summary or list of all implemented BMPs, including observations of all erosion/sediment control structures or practices.

   g. A description of:

      i. BMPs inspected (including location).

      ii. BMPs that need maintenance and why.

      iii. BMPs that failed to operate as designed or intended, and

      iv. Where additional or different BMPs are needed, and why.

   h. A description of stormwater discharged from the site. The Permittee must note the presence of suspended sediment, turbidity, discoloration, and oil sheen, as applicable.

i. Any water quality monitoring performed during inspection.

j. General comments and notes, including a brief description of any BMP repairs, maintenance, or installations made following the inspection.

k. An implementation schedule for the remedial actions that the Permittee plans to take if the site inspection indicates that the site is out of compliance. The remedial actions taken must meet the requirements of the SWPPP and the permit.

l. A summary report of the inspection.

m. The name, title, and signature of the person conducting the site inspection, a phone number or other reliable method to reach this person, and the following statement: *I certify that this report is true, accurate, and complete to the best of my knowledge and belief.*

Table 3 Summary of Primary Monitoring Requirements

Size of Soil Disturbance[1]	Weekly Site Inspections	Weekly Sampling w/ Turbidity Meter	Weekly Sampling w/ Transparency Tube	Weekly pH Sampling[2]	CESCL Required for Inspections?
Sites that disturb less than 1 acre, but are part of a larger Common Plan of Development	Required	Not Required	Not Required	Not Required	No
Sites that disturb 1 acre or more, but fewer than 5 acres	Required	Sampling Required – either method[3]		Required	Yes
Sites that disturb 5 acres or more	Required	Required	Not Required[4]	Required	Yes

[1] Soil disturbance is calculated by adding together all areas that will be affected by construction activity. Construction activity means clearing, grading, excavation, and any other activity that disturbs the surface of the land, including ingress/egress from the site.

[2] If construction activity results in the disturbance of 1 acre or more, and involves significant concrete work (1,000 cubic yards of concrete or recycled concrete placed or poured over the life of a project) or the use of engineered soils (soil amendments including but not limited to Portland cement-treated base [CTB], cement kiln dust [CKD], or fly ash), and stormwater from the affected area drains to surface waters of the State or to a storm sewer stormwater collection system that drains to other surface waters of the State, the Permittee must conduct pH sampling in accordance with Special Condition S4.D.

[3] Sites with one or more acres, but fewer than 5 acres of soil disturbance, must conduct turbidity or transparency sampling in accordance with Special Condition S4.C.4.a or b.

[4] Sites equal to or greater than 5 acres of soil disturbance must conduct turbidity sampling using a turbidity meter in accordance with Special Condition S4.C.4.a.

C. Turbidity/Transparency Sampling Requirements

1. Sampling Methods

    a. If construction activity involves the disturbance of five (5) acres or more, the Permittee must conduct turbidity sampling per Special Condition S4.C.4.a, below.

    b. If construction activity involves one (1) acre or more but fewer than five (5) acres of soil disturbance, the Permittee must conduct either transparency sampling *or* turbidity sampling per Special Condition S4.C.4.a or b, below.

2. Sampling Frequency

    a. The Permittee must sample all discharge points at least once every calendar week when stormwater (or authorized non-stormwater) discharges from the site or enters any on-site surface waters of the state (for example, a creek running through a site); sampling is not required on sites that disturb less than an acre.

    b. Samples must be representative of the flow and characteristics of the discharge.

    c. Sampling is not required when there is no discharge during a calendar week.

    d. Sampling is not required outside of normal working hours or during unsafe conditions.

    e. If the Permittee is unable to sample during a monitoring period, the Permittee must include a brief explanation in the monthly Discharge Monitoring Report (DMR).

    f. Sampling is not required before construction activity begins.

    g. The Permittee may reduce the sampling frequency for temporarily stabilized, inactive sites to once every calendar month.

3. Sampling Locations

    a. Sampling is required at all points where stormwater associated with construction activity (or authorized non-stormwater) is discharged off site, including where it enters any on-site surface waters of the state (for example, a creek running through a site).

    b. The Permittee may discontinue sampling at discharge points that drain areas of the project that are fully stabilized to prevent erosion.

    c. The Permittee must identify all sampling point(s) in the SWPPP and on the site map and clearly mark these points in the field with a flag, tape, stake or other visible marker.

    d. Sampling is not required for discharge that is sent directly to sanitary or combined sewer systems.

    e. The Permittee may discontinue sampling at discharge points in areas of the project where the Permittee no longer has operational control of the construction activity.

4. Sampling and Analysis Methods

   a. The Permittee performs turbidity analysis with a calibrated turbidity meter (turbidimeter) either on site or at an accredited lab. The Permittee must record the results in the site log book in nephelometric turbidity units (NTUs).

   b. The Permittee performs transparency analysis on site with a 1¾ inch diameter, 60 centimeter (cm)-long transparency tube. The Permittee will record the results in the site log book in centimeters (cm).

Table 4 Monitoring and Reporting Requirements

Parameter	Unit	Analytical Method	Sampling Frequency	Benchmark Value
Turbidity	NTU	SM2130	Weekly, if discharging	25 NTUs
Transparency	Cm	Manufacturer instructions, or Ecology guidance	Weekly, if discharging	33 cm

5. Turbidity/Transparency Benchmark Values and Reporting Triggers

   The benchmark value for turbidity is 25 NTUs. The benchmark value for transparency is 33 centimeters (cm). Note: Benchmark values do not apply to discharges to segments of water bodies on Washington State's 303(d) list (Category 5) for turbidity, fine sediment, or phosphorus; these discharges are subject to a numeric effluent limit for turbidity. Refer to Special Condition S8 for more information and follow S5.F – Noncompliance Notification for reporting requirements applicable to discharges which exceed the numeric effluent limit for turbidity.

   a. Turbidity 26 – 249 NTUs, or Transparency 32 – 7 cm:

      If the discharge turbidity is 26 to 249 NTUs; or if discharge transparency is 32 to 7 cm, the Permittee must:

      i. Immediately begin the process to fully implement and maintain appropriate source control and/or treatment BMPs, and no later than 10 days of the date the discharge exceeded the benchmark. If installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when the Permittee requests an extension within the initial 10-day response period.

      ii. Review the SWPPP for compliance with Special Condition S9 and make appropriate revisions within 7 days of the date the discharge exceeded the benchmark.

      iii. Document BMP implementation and maintenance in the site log book.

   b. Turbidity 250 NTUs or greater, or Transparency 6 cm or less:

      If a discharge point's turbidity is 250 NTUs or greater, or if discharge transparency is less than or equal to 6 cm, the Permittee must complete the reporting and adaptive

management process described below. For discharges which are subject to a numeric effluent limit for turbidity, see S5.F – Noncompliance Notification.

i. Within 24 hours, telephone or submit an electronic report to the applicable Ecology Region's Environmental Report Tracking System (ERTS) number (or through Ecology's Water Quality Permitting Portal [WQWebPortal] – Permit Submittals when the form is available), in accordance with Special Condition S5.A.

- **Central Region** (Okanogan, Chelan, Douglas, Kittitas, Yakima, Klickitat, Benton): (509) 575-2490
- **Eastern Region** (Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman): (509) 329-3400
- **Northwest Region** (Kitsap, Snohomish, Island, King, San Juan, Skagit, Whatcom): (425) 649-7000
- **Southwest Region** (Grays Harbor, Lewis, Mason, Thurston, Pierce, Clark, Cowlitz, Skamania, Wahkiakum, Clallam, Jefferson, Pacific): (360) 407-6300

These numbers and a link to the ERTS reporting page are also listed at the following website: http://www.ecy.wa.gov/programs/wq/stormwater/construction/index.html.

ii. Immediately begin the process to fully implement and maintain appropriate source control and/or treatment BMPs as soon as possible, addressing the problems within 10 days of the date the discharge exceeded the benchmark. If installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when the Permittee requests an extension within the initial 10-day response period.

iii. Sample discharges daily until:

a) Turbidity is 25 NTUs (or lower); or

b) Transparency is 33 cm (or greater); or

c) The Permittee has demonstrated compliance with the water quality standard for turbidity:

1) No more than 5 NTUs over background turbidity, if background is less than 50 NTUs, or

2) No more than 10% over background turbidity, if background is 50 NTUs or greater; or

*Note: background turbidity in the receiving water must be measured immediately upstream (upgradient) or outside of the area of influence of the discharge.

d) The discharge stops or is eliminated.

iv. Review the SWPPP for compliance with Special Condition S9 and make appropriate revisions within seven (7) days of the date the discharge exceeded the benchmark.

v. Document BMP implementation and maintenance in the site log book.

Compliance with these requirements does not relieve the Permittee from responsibility to maintain continuous compliance with permit benchmarks.

D. pH Sampling Requirements – Significant Concrete Work or Engineered Soils

If construction activity results in the disturbance of 1 acre or more, *and* involves significant concrete work (significant concrete work means greater than 1000 cubic yards placed or poured concrete or recycled concrete used over the life of a project) or the use of engineered soils (soil amendments including but not limited to Portland cement-treated base [CTB], cement kiln dust [CKD], or fly ash), and stormwater from the affected area drains to surface waters of the State or to a storm sewer system that drains to surface waters of the State, the Permittee must conduct pH sampling as set forth below. Note: In addition, discharges to segments of water bodies on Washington State's 303(d) list (Category 5) for high pH are subject to a numeric effluent limit for pH; refer to Special Condition S8.

1. The Permittee must perform pH analysis on site with a calibrated pH meter, pH test kit, or wide range pH indicator paper. The Permittee must record pH sampling results in the site log book.

2. During the applicable pH monitoring period defined below, the Permittee must obtain a representative sample of stormwater and conduct pH analysis at least once per week.

    a. For sites with significant concrete work, the Permittee must begin the pH sampling period when the concrete is first placed or poured and exposed to precipitation, and continue weekly throughout and after the concrete placement, pour and curing period, until stormwater pH is in the range of 6.5 to 8.5 (su).

    b. For sites with recycled concrete where monitoring is required, the Permittee must begin the weekly pH sampling period when the recycled concrete is first exposed to precipitation and must continue until the recycled concrete is fully stabilized with the stormwater pH in the range of 6.5 to 8.5 (su).

    c. For sites with engineered soils, the Permittee must begin the pH sampling period when the soil amendments are first exposed to precipitation and must continue until the area of engineered soils is fully stabilized.

3. The Permittee must sample pH in the sediment trap/pond(s) or other locations that receive stormwater runoff from the area of significant concrete work or engineered soils before the stormwater discharges to surface waters.

4. The benchmark value for pH is 8.5 standard units. Anytime sampling indicates that pH is 8.5 or greater, the Permittee must either:

    a. Prevent the high pH water (8.5 or above) from entering storm sewer systems or surface waters of the state; *or*

    b. If necessary, adjust or neutralize the high pH water until it is in the range of pH 6.5 to 8.5 (su) using an appropriate treatment BMP such as carbon dioxide (CO_2) sparging, dry ice or food grade vinegar. The Permittee must obtain written approval from Ecology before using any form of chemical treatment other than CO_2 sparging, dry ice or food grade vinegar.

S5. REPORTING AND RECORDKEEPING REQUIREMENTS

A. High Turbidity Reporting

Anytime sampling performed in accordance with Special Condition S4.C indicates turbidity has reached the 250 NTUs or more (or transparency less than or equal to 6 cm), high turbidity reporting level, the Permittee must notify Ecology within 24 hours of analysis either by calling the applicable Ecology Region's Environmental Report Tracking System (ERTS) number by phone or by submitting an electronic ERTS report (through Ecology's Water Quality Permitting Portal (WQWebPortal) – Permit Submittals when the form is available). See the CSWGP website for links to ERTS and the WQWebPortal. (http://www.ecy.wa.gov/programs/wq/stormwater/construction/index.html) Also, see phone numbers in Special Condition S4.C.5.b.i.

B. Discharge Monitoring Reports (DMRs)

Permittees required to conduct water quality sampling in accordance with Special Conditions S4.C (Turbidity/Transparency), S4.D (pH), S8 (303[d]/TMDL sampling), and/or G12 (Additional Sampling) must submit the results to Ecology.

Permittees must submit monitoring data using Ecology's WQWebDMR web application accessed through Ecology's Water Quality Permitting Portal.

Permittees unable to submit electronically (for example, those who do not have an internet connection) must contact Ecology to request a waiver and obtain instructions on how to obtain a paper copy DMR at:

Department of Ecology
Water Quality Program - Construction Stormwater
PO Box 47696
Olympia, WA 98504-7696

Permittees who obtain a waiver not to use WQWebDMR must use the forms provided to them by Ecology; submittals must be mailed to the address above. Permittees must submit DMR forms to be received by Ecology within 15 days following the end of each month.

If there was no discharge during a given monitoring period, all Permittees must submit a DMR as required with "no discharge" entered in place of the monitoring results. DMRs are required for the full duration of permit coverage (from the first full month following the effective date of permit coverage up until Ecology has approved termination of the coverage). For more information, contact Ecology staff using information provided at the following website: www.ecy.wa.gov/programs/wq/permits/paris/contacts.html.

C. Records Retention

The Permittee must retain records of all monitoring information (site log book, sampling results, inspection reports/checklists, etc.), Stormwater Pollution Prevention Plan, copy of the permit coverage letter (including Transfer of Coverage documentation) and any other documentation of compliance with permit requirements for the entire life of the construction project and for a minimum of five (5) years following the termination of permit coverage. Such information must include all calibration and maintenance records, and records of all data used to complete the application for this permit. This period of retention must be extended during

the course of any unresolved litigation regarding the discharge of pollutants by the Permittee or when requested by Ecology.

D. Recording Results

For each measurement or sample taken, the Permittee must record the following information:

1. Date, place, method, and time of sampling or measurement.
2. The first and last name of the individual who performed the sampling or measurement.
3. The date(s) the analyses were performed.
4. The first and last name of the individual who performed the analyses.
5. The analytical techniques or methods used.
6. The results of all analyses.

E. Additional Monitoring by the Permittee

If the Permittee samples or monitors any pollutant more frequently than required by this permit using test procedures specified by Special Condition S4 of this permit, the sampling results for this monitoring must be included in the calculation and reporting of the data submitted in the Permittee's DMR.

F. Noncompliance Notification

In the event the Permittee is unable to comply with any part of the terms and conditions of this permit, and the resulting noncompliance may cause a threat to human health or the environment (such as but not limited to spills or fuels or other materials, catastrophic pond or slope failure, and discharges that violate water quality standards), or exceed numeric effluent limitations (see S8 – Discharges to 303(d) or TMDL Waterbodies), the Permittee must, upon becoming aware of the circumstance:

1. Notify Ecology within 24 hours of the failure to comply by calling the applicable Regional office ERTS phone number (refer to Special Condition S4.C.5.b.i, or go to https://ecology.wa.gov/About-us/Get-involved/Report-an-environmental-issue to find contact information for the regional offices.)
2. Immediately take action to prevent the discharge/pollution, or otherwise stop or correct the noncompliance, and, if applicable, repeat sampling and analysis of any noncompliance immediately and submit the results to Ecology within five (5) days of becoming aware of the violation (See S5.F.3, below, for details on submitting results in a report).
3. Submit a detailed written report to Ecology within five (5) days of the time the Permittee becomes aware of the circumstances, unless requested earlier by Ecology. The report must be submitted using Ecology's Water Quality Permitting Portal (WQWebPortal) – Permit Submittals, unless a waiver from electronic reporting has been granted according to S5.B. The report must contain a description of the noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

The Permittee must report any unanticipated bypass and/or upset that exceeds any effluent limit in the permit in accordance with the 24-hour reporting requirement contained in 40 C.F.R. 122.41(l)(6).

Compliance with these requirements does not relieve the Permittee from responsibility to maintain continuous compliance with the terms and conditions of this permit or the resulting liability for failure to comply. Upon request of the Permittee, Ecology may waive the requirement for a written report on a case-by-case basis, if the immediate notification is received by Ecology within 24 hours.

G. Access to Plans and Records

1. The Permittee must retain the following permit documentation (plans and records) on site, or within reasonable access to the site, for use by the operator or for on-site review by Ecology or the local jurisdiction:

    a. General Permit

    b. Permit Coverage Letter

    c. Stormwater Pollution Prevention Plan (SWPPP)

    d. Site Log Book

    e. Erosivity Waiver (if applicable)

2. The Permittee must address written requests for plans and records listed above (Special Condition S5.G.1) as follows:

    a. The Permittee must provide a copy of plans and records to Ecology within 14 days of receipt of a written request from Ecology.

    b. The Permittee must provide a copy of plans and records to the public when requested in writing. Upon receiving a written request from the public for the Permittee's plans and records, the Permittee must either:

        i. Provide a copy of the plans and records to the requester within 14 days of a receipt of the written request; *or*

        ii. Notify the requester within 10 days of receipt of the written request of the location and times within normal business hours when the plans and records may be viewed; and provide access to the plans and records within 14 days of receipt of the written request; *or*

            Within 14 days of receipt of the written request, the Permittee may submit a copy of the plans and records to Ecology for viewing and/or copying by the requester at an Ecology office, or a mutually agreed location. If plans and records are viewed and/or copied at a location other than at an Ecology office, the Permittee will provide reasonable access to copying services for which a reasonable fee may be charged. The Permittee must notify the requester within 10 days of receipt of the request where the plans and records may be viewed and/or copied.

S6. PERMIT FEES

The Permittee must pay permit fees assessed by Ecology. Fees for stormwater discharges covered under this permit are established by Chapter 173-224 WAC. Ecology continues to assess permit fees until the permit is terminated in accordance with Special Condition S10 or revoked in accordance with General Condition G5.

S7. SOLID AND LIQUID WASTE DISPOSAL

The Permittee must handle and dispose of solid and liquid wastes generated by construction activity, such as demolition debris, construction materials, contaminated materials, and waste materials from maintenance activities, including liquids and solids from cleaning catch basins and other stormwater facilities, in accordance with:

A. Special Condition S3, Compliance with Standards.

B. WAC 173-216-110.

C. Other applicable regulations.

S8. DISCHARGES TO 303(d) OR TMDL WATERBODIES

A. Sampling and Numeric Effluent Limits For Certain Discharges to 303(d)-Listed Water Bodies

1. Permittees who discharge to segments of water bodies listed as impaired by the State of Washington under Section 303(d) of the Clean Water Act for turbidity, fine sediment, high pH, or phosphorus, must conduct water quality sampling according to the requirements of this section, and Special Conditions S4.C.2.b-f and S4.C.3.b-d, and must comply with the applicable numeric effluent limitations in S8.C and S8.D.

2. All references and requirements associated with Section 303(d) of the Clean Water Act mean the most current listing by Ecology of impaired waters (Category 5) that exists on January 1, 2021, or the date when the operator's complete permit application is received by Ecology, whichever is later.

B. Limits on Coverage for New Discharges to TMDL or 303(d)-Listed Waters

Construction sites that discharge to a TMDL or 303(d)-listed waterbody are not eligible for coverage under this permit *unless* the operator:

1. Prevents exposing stormwater to pollutants for which the waterbody is impaired, and retains documentation in the SWPPP that details procedures taken to prevent exposure on site; *or*

2. Documents that the pollutants for which the waterbody is impaired are not present at the site, and retains documentation of this finding within the SWPPP; *or*

3. Provides Ecology with data indicating the discharge is not expected to cause or contribute to an exceedance of a water quality standard, and retains such data on site with the SWPPP. The operator must provide data and other technical information to Ecology that sufficiently demonstrate:

    a. For discharges to waters without an EPA-approved or -established TMDL, that the discharge of the pollutant for which the water is impaired will meet in-stream water quality criteria at the point of discharge to the waterbody; *or*

    b. For discharges to waters with an EPA-approved or -established TMDL, that there is sufficient remaining wasteload allocation in the TMDL to allow construction stormwater discharge and that existing dischargers to the waterbody are subject to compliance schedules designed to bring the waterbody into attainment with water quality standards.

    Operators of construction sites are eligible for coverage under this permit only after Ecology makes an affirmative determination that the *discharge will not cause or contribute to the existing impairment or exceed the TMDL.*

C. Sampling and Numeric Effluent Limits for Discharges to Water Bodies on the 303(d) List for Turbidity, Fine Sediment, or Phosphorus

1. Permittees who discharge to segments of water bodies on the 303(d) list (Category 5) for turbidity, fine sediment, or phosphorus must conduct turbidity sampling in accordance with Special Condition S4.C.2 and comply with either of the numeric effluent limits noted in Table 5 below.

2. As an alternative to the 25 NTUs effluent limit noted in Table 5 below (applied at the point where stormwater [or authorized non-stormwater] is discharged off-site), Permittees may choose to comply with the surface water quality standard for turbidity. The standard is: no more than 5 NTUs over background turbidity when the background turbidity is 50 NTUs or less, or no more than a 10% increase in turbidity when the background turbidity is more than 50 NTUs. In order to use the water quality standard requirement, the sampling must take place at the following locations:

    a. Background turbidity in the 303(d)-listed receiving water immediately upstream (upgradient) or outside the area of influence of the discharge.

    b. Turbidity at the point of discharge into the 303(d)-listed receiving water, inside the area of influence of the discharge**.**

3. Discharges that exceed the numeric effluent limit for turbidity constitute a violation of this permit.

4. Permittees whose discharges exceed the numeric effluent limit must sample discharges daily until the violation is corrected and comply with the non-compliance notification requirements in Special Condition S5.F.

Table 5 Turbidity, Fine Sediment & Phosphorus Sampling and Limits for 303(d)-Listed Waters

Parameter identified in 303(d) listing	Parameter Sampled	Unit	Analytical Method	Sampling Frequency	Numeric Effluent Limit[1]
• Turbidity • Fine Sediment • Phosphorus	Turbidity	NTU	SM2130	Weekly, if discharging	25 NTUs, at the point where stormwater is discharged from the site; ***OR*** In compliance with the surface water quality standard for turbidity (S8.C.2.a)

[1] Permittees subject to a numeric effluent limit for turbidity may, at their discretion, choose either numeric effluent limitation based on site-specific considerations including, but not limited to, safety, access and convenience.

D. Discharges to Water Bodies on the 303(d) List for High pH

1. Permittees who discharge to segments of water bodies on the 303(d) list (Category 5) for high pH must conduct pH sampling in accordance with the table below, and comply with the numeric effluent limit of pH 6.5 to 8.5 su (Table 6).

Table 6 pH Sampling and Limits for 303(d)-Listed Waters

Parameter identified in 303(d) listing	Parameter Sampled/Units	Analytical Method	Sampling Frequency	Numeric Effluent Limit
High pH	pH /Standard Units	pH meter	Weekly, if discharging	In the range of 6.5 – 8.5 su

2. At the Permittee's discretion, compliance with the limit shall be assessed at one of the following locations:

   a. Directly in the 303(d)-listed waterbody segment, inside the immediate area of influence of the discharge; *or*

   b. Alternatively, the Permittee may measure pH at the point where the discharge leaves the construction site, rather than in the receiving water.

3. Discharges that exceed the numeric effluent limit for pH (outside the range of 6.5 – 8.5 su) constitute a violation of this permit.

4. Permittees whose discharges exceed the numeric effluent limit must sample discharges daily until the violation is corrected and comply with the non-compliance notification requirements in Special Condition S5.F.

E. Sampling and Limits for Sites Discharging to Waters Covered by a TMDL or another Pollution Control Plan

1. Discharges to a waterbody that is subject to a Total Maximum Daily Load (TMDL) for turbidity, fine sediment, high pH, or phosphorus must be consistent with the TMDL. Refer to http://www.ecy.wa.gov/programs/wq/tmdl/TMDLsbyWria/TMDLbyWria.html for more information on TMDLs.

    a. Where an applicable TMDL sets specific waste load allocations or requirements for discharges covered by this permit, discharges must be consistent with any specific waste load allocations or requirements established by the applicable TMDL.

        i. The Permittee must sample discharges weekly, unless otherwise specified by the TMDL, to evaluate compliance with the specific waste load allocations or requirements.

        ii. Analytical methods used to meet the monitoring requirements must conform to the latest revision of the *Guidelines Establishing Test Procedures for the Analysis of Pollutants* contained in 40 CFR Part 136.

        iii. Turbidity and pH methods need not be accredited or registered unless conducted at a laboratory which must otherwise be accredited or registered.

    b. Where an applicable TMDL has established a general waste load allocation for construction stormwater discharges, but has not identified specific requirements, compliance with Special Conditions S4 (Monitoring) and S9 (SWPPPs) will constitute compliance with the approved TMDL.

    c. Where an applicable TMDL has not specified a waste load allocation for construction stormwater discharges, but has not excluded these discharges, compliance with Special Conditions S4 (Monitoring) and S9 (SWPPPs) will constitute compliance with the approved TMDL.

    d. Where an applicable TMDL specifically precludes or prohibits discharges from construction activity, the operator is not eligible for coverage under this permit.

S9. STORMWATER POLLUTION PREVENTION PLAN

The Permittee must prepare and properly implement an adequate Stormwater Pollution Prevention Plan (SWPPP) for construction activity in accordance with the requirements of this permit beginning with initial soil disturbance and until final stabilization.

A. The Permittee's SWPPP must meet the following objectives:

1. To identify best management practices (BMPs) which prevent erosion and sedimentation, and to reduce, eliminate or prevent stormwater contamination and water pollution from construction activity.

2. To prevent violations of surface water quality, groundwater quality, or sediment management standards.

3. To control peak volumetric flow rates and velocities of stormwater discharges.

B. General Requirements

1. The SWPPP must include a narrative and drawings. All BMPs must be clearly referenced in the narrative and marked on the drawings. The SWPPP narrative must include documentation to explain and justify the pollution prevention decisions made for the project. Documentation must include:

    a. Information about existing site conditions (topography, drainage, soils, vegetation, etc.).

    b. Potential erosion problem areas.

    c. The 13 elements of a SWPPP in Special Condition S9.D.1-13, including BMPs used to address each element.

    d. Construction phasing/sequence and general BMP implementation schedule.

    e. The actions to be taken if BMP performance goals are not achieved—for example, a contingency plan for additional treatment and/or storage of stormwater that would violate the water quality standards if discharged.

    f. Engineering calculations for ponds, treatment systems, and any other designed structures. When a treatment system requires engineering calculations, these calculations must be included in the SWPPP. Engineering calculations do not need to be included in the SWPPP for treatment systems that do not require such calculations.

2. The Permittee must modify the SWPPP if, during inspections or investigations conducted by the owner/operator, or the applicable local or state regulatory authority, it is determined that the SWPPP is, or would be, ineffective in eliminating or significantly minimizing pollutants in stormwater discharges from the site. The Permittee must then:

    a. Review the SWPPP for compliance with Special Condition S9 and make appropriate revisions within 7 days of the inspection or investigation.

    b. Immediately begin the process to fully implement and maintain appropriate source control and/or treatment BMPs as soon as possible, addressing the problems no later than 10 days from the inspection or investigation. If installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when an extension is requested by a Permittee within the initial 10-day response period.

    c. Document BMP implementation and maintenance in the site log book.

    The Permittee must modify the SWPPP whenever there is a change in design, construction, operation, or maintenance at the construction site that has, or could have, a significant effect on the discharge of pollutants to waters of the State.

C. Stormwater Best Management Practices (BMPs)

BMPs must be consistent with:

1. *Stormwater Management Manual for Western Washington* (most current approved edition at the time this permit was issued), for sites west of the crest of the Cascade Mountains; *or*

2. *Stormwater Management Manual for Eastern Washington* (most current approved edition at the time this permit was issued), for sites east of the crest of the Cascade Mountains; *or*

3. Revisions to the manuals listed in Special Condition S9.C.1 & 2, or other stormwater management guidance documents or manuals which provide an equivalent level of pollution prevention, that are approved by Ecology and incorporated into this permit in accordance with the permit modification requirements of WAC 173-226-230; *or*

4. Documentation in the SWPPP that the BMPs selected provide an equivalent level of pollution prevention, compared to the applicable stormwater management manuals, including:

    a. The technical basis for the selection of all stormwater BMPs (scientific, technical studies, and/or modeling) that support the performance claims for the BMPs being selected.

    b. An assessment of how the selected BMP will satisfy AKART requirements and the applicable federal technology-based treatment requirements under 40 CFR part 125.3.

D. SWPPP – Narrative Contents and Requirements

The Permittee must include each of the 13 elements below in Special Condition S9.D.1-13 in the narrative of the SWPPP and implement them unless site conditions render the element unnecessary and the exemption from that element is clearly justified in the SWPPP.

1. Preserve Vegetation/Mark Clearing Limits

    a. Before beginning land-disturbing activities, including clearing and grading, clearly mark all clearing limits, sensitive areas and their buffers, and trees that are to be preserved within the construction area.

    b. Retain the duff layer, native topsoil, and natural vegetation in an undisturbed state to the maximum degree practicable.

2. Establish Construction Access

    a. Limit construction vehicle access and exit to one route, if possible.

    b. Stabilize access points with a pad of quarry spalls, crushed rock, or other equivalent BMPs, to minimize tracking sediment onto roads.

    c. Locate wheel wash or tire baths on site, if the stabilized construction entrance is not effective in preventing tracking sediment onto roads.

    d. If sediment is tracked off site, clean the affected roadway thoroughly at the end of each day, or more frequently as necessary (for example, during wet weather). Remove sediment from roads by shoveling, sweeping, or pickup and transport of the sediment to a controlled sediment disposal area.

    e. Conduct street washing only after sediment removal in accordance with Special Condition S9.D.2.d.

    f. Control street wash wastewater by pumping back on site or otherwise preventing it from discharging into systems tributary to waters of the State.

3. Control Flow Rates

    a. Protect properties and waterways downstream of construction sites from erosion and the associated discharge of turbid waters due to increases in the velocity and peak volumetric flow rate of stormwater runoff from the project site, as required by local plan approval authority.

    b. Where necessary to comply with Special Condition S9.D.3.a, construct stormwater infiltration or detention BMPs as one of the first steps in grading. Assure that detention BMPs function properly before constructing site improvements (for example, impervious surfaces).

    c. If permanent infiltration ponds are used for flow control during construction, protect these facilities from sedimentation during the construction phase.

4. Install Sediment Controls

    The Permittee must design, install and maintain effective erosion controls and sediment controls to minimize the discharge of pollutants. At a minimum, the Permittee must:

    a. Construct sediment control BMPs (sediment ponds, traps, filters, infiltration facilities, etc.) as one of the first steps in grading. These BMPs must be functional before other land disturbing activities take place.

    b. Minimize sediment discharges from the site. The design, installation and maintenance of erosion and sediment controls must address factors such as the amount, frequency, intensity and duration of precipitation, the nature of resulting stormwater runoff, and soil characteristics, including the range of soil particle sizes expected to be present on the site.

    c. Direct stormwater runoff from disturbed areas through a sediment pond or other appropriate sediment removal BMP, before the runoff leaves a construction site or before discharge to an infiltration facility. Runoff from fully stabilized areas may be discharged without a sediment removal BMP, but must meet the flow control performance standard of Special Condition S9.D.3.a.

    d. Locate BMPs intended to trap sediment on site in a manner to avoid interference with the movement of juvenile salmonids attempting to enter off-channel areas or drainages.

    e. Provide and maintain natural buffers around surface waters, direct stormwater to vegetated areas to increase sediment removal and maximize stormwater infiltration, unless infeasible.

    f. Where feasible, design outlet structures that withdraw impounded stormwater from the surface to avoid discharging sediment that is still suspended lower in the water column.

5. Stabilize Soils

    a. The Permittee must stabilize exposed and unworked soils by application of effective BMPs that prevent erosion. Applicable BMPs include, but are not limited to: temporary and permanent seeding, sodding, mulching, plastic covering, erosion

control fabrics and matting, soil application of polyacrylamide (PAM), the early application of gravel base on areas to be paved, and dust control.

b. The Permittee must control stormwater volume and velocity within the site to minimize soil erosion.

c. The Permittee must control stormwater discharges, including both peak flow rates and total stormwater volume, to minimize erosion at outlets and to minimize downstream channel and stream bank erosion.

d. Depending on the geographic location of the project, the Permittee must not allow soils to remain exposed and unworked for more than the time periods set forth below to prevent erosion.

West of the Cascade Mountains Crest
During the dry season (May 1 - September 30): 7 days
During the wet season (October 1 - April 30): 2 days

East of the Cascade Mountains Crest, except for Central Basin*
During the dry season (July 1 - September 30): 10 days
During the wet season (October 1 - June 30): 5 days

The Central Basin*, East of the Cascade Mountains Crest
During the dry Season (July 1 - September 30): 30 days
During the wet season (October 1 - June 30): 15 days

***Note: The Central Basin** is defined as the portions of Eastern Washington with mean annual precipitation of less than 12 inches.

e. The Permittee must stabilize soils at the end of the shift before a holiday or weekend if needed based on the weather forecast.

f. The Permittee must stabilize soil stockpiles from erosion, protected with sediment trapping measures, and where possible, be located away from storm drain inlets, waterways, and drainage channels.

g. The Permittee must minimize the amount of soil exposed during construction activity.

h. The Permittee must minimize the disturbance of steep slopes.

i. The Permittee must minimize soil compaction and, unless infeasible, preserve topsoil.

6. Protect Slopes

a. The Permittee must design and construct cut-and-fill slopes in a manner to minimize erosion. Applicable practices include, but are not limited to, reducing continuous length of slope with terracing and diversions, reducing slope steepness, and roughening slope surfaces (for example, track walking).

b. The Permittee must divert off-site stormwater (run-on) or groundwater away from slopes and disturbed areas with interceptor dikes, pipes, and/or swales. Off-site stormwater should be managed separately from stormwater generated on the site.

c. At the top of slopes, collect drainage in pipe slope drains or protected channels to prevent erosion.

i. West of the Cascade Mountains Crest: Temporary pipe slope drains must handle the peak 10-minute flow rate from a Type 1A, 10-year, 24-hour frequency storm for the developed condition. Alternatively, the 10-year, 1-hour flow rate predicted by an approved continuous runoff model, increased by a factor of 1.6, may be used. The hydrologic analysis must use the existing land cover condition for predicting flow rates from tributary areas outside the project limits. For tributary areas on the project site, the analysis must use the temporary or permanent project land cover condition, whichever will produce the highest flow rates. If using the Western Washington Hydrology Model (WWHM) to predict flows, bare soil areas should be modeled as "landscaped area."

ii. East of the Cascade Mountains Crest: Temporary pipe slope drains must handle the expected peak flow rate from a 6-month, 3-hour storm for the developed condition, referred to as the short duration storm.

d. Place excavated material on the uphill side of trenches, consistent with safety and space considerations.

e. Place check dams at regular intervals within constructed channels that are cut down a slope.

7. Protect Drain Inlets

a. Protect all storm drain inlets made operable during construction so that stormwater runoff does not enter the conveyance system without first being filtered or treated to remove sediment.

b. Clean or remove and replace inlet protection devices when sediment has filled one-third of the available storage (unless a different standard is specified by the product manufacturer).

8. Stabilize Channels and Outlets

a. Design, construct and stabilize all on-site conveyance channels to prevent erosion from the following expected peak flows:

i. West of the Cascade Mountains Crest: Channels must handle the peak 10-minute flow rate from a Type 1A, 10-year, 24-hour frequency storm for the developed condition. Alternatively, the 10-year, 1-hour flow rate indicated by an approved continuous runoff model, increased by a factor of 1.6, may be used. The hydrologic analysis must use the existing land cover condition for predicting flow rates from tributary areas outside the project limits. For tributary areas on the project site, the analysis must use the temporary or permanent project land cover condition, whichever will produce the highest flow rates. If using the WWHM to predict flows, bare soil areas should be modeled as "landscaped area."

ii. East of the Cascade Mountains Crest: Channels must handle the expected peak flow rate from a 6-month, 3-hour storm for the developed condition, referred to as the short duration storm.

b. Provide stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent stream banks, slopes, and downstream reaches at the outlets of all conveyance systems.

9. Control Pollutants

Design, install, implement and maintain effective pollution prevention measures to minimize the discharge of pollutants. The Permittee must:

a. Handle and dispose of all pollutants, including waste materials and demolition debris that occur on site in a manner that does not cause contamination of stormwater.

b. Provide cover, containment, and protection from vandalism for all chemicals, liquid products, petroleum products, and other materials that have the potential to pose a threat to human health or the environment. Minimize storage of hazardous materials on-site. Safety Data Sheets (SDS) should be supplied for all materials stored. Chemicals should be kept in their original labeled containers. On-site fueling tanks must include secondary containment. Secondary containment means placing tanks or containers within an impervious structure capable of containing 110% of the volume of the largest tank within the containment structure. Double-walled tanks do not require additional secondary containment.

c. Conduct maintenance, fueling, and repair of heavy equipment and vehicles using spill prevention and control measures. Clean contaminated surfaces immediately following any spill incident.

d. Discharge wheel wash or tire bath wastewater to a separate on-site treatment system that prevents discharge to surface water, such as closed-loop recirculation or upland land application, or to the sanitary sewer with local sewer district approval.

e. Apply fertilizers and pesticides in a manner and at application rates that will not result in loss of chemical to stormwater runoff. Follow manufacturers' label requirements for application rates and procedures.

f. Use BMPs to prevent contamination of stormwater runoff by pH-modifying sources. The sources for this contamination include, but are not limited to: bulk cement, cement kiln dust, fly ash, new concrete washing and curing waters, recycled concrete stockpiles, waste streams generated from concrete grinding and sawing, exposed aggregate processes, dewatering concrete vaults, concrete pumping and mixer washout waters. (Also refer to the definition for "concrete wastewater" in Appendix A – Definitions.)

g. Adjust the pH of stormwater or authorized non-stormwater if necessary to prevent an exceedance of groundwater and/or surface water quality standards.

h. Assure that washout of concrete trucks is performed off-site or in designated concrete washout areas only. Do not wash out concrete truck drums onto the ground, or into storm drains, open ditches, streets, or streams. Washout of small concrete handling equipment may be disposed of in a formed area awaiting concrete where it will not contaminate surface or groundwater. Do not dump excess concrete on site, except in designated concrete washout areas. Concrete spillage or concrete discharge directly to groundwater or surface waters of the State is

prohibited. At no time shall concrete be washed off into the footprint of an area where an infiltration BMP will be installed.

i. Obtain written approval from Ecology before using any chemical treatment, with the exception of CO_2, dry ice or food grade vinegar, to adjust pH.

j. Uncontaminated water from water-only based shaft drilling for construction of building, road, and bridge foundations may be infiltrated provided the wastewater is managed in a way that prohibits discharge to surface waters. Prior to infiltration, water from water-only based shaft drilling that comes into contact with curing concrete must be neutralized until pH is in the range of 6.5 to 8.5 (su).

10. Control Dewatering

a. Permittees must discharge foundation, vault, and trench dewatering water, which have characteristics similar to stormwater runoff at the site, in conjunction with BMPs to reduce sedimentation before discharge to a sediment trap or sediment pond.

b. Permittees may discharge clean, non-turbid dewatering water, such as well-point groundwater, to systems tributary to, or directly into surface waters of the State, as specified in Special Condition S9.D.8, provided the dewatering flow does not cause erosion or flooding of receiving waters. Do not route clean dewatering water through stormwater sediment ponds. Note that "surface waters of the State" may exist on a construction site as well as off site; for example, a creek running through a site.

c. Other dewatering treatment or disposal options may include:

i. Infiltration

ii. Transport off site in a vehicle, such as a vacuum flush truck, for legal disposal in a manner that does not pollute state waters.

iii. Ecology-approved on-site chemical treatment or other suitable treatment technologies (See S9.D.9.i, regarding chemical treatment written approval).

iv. Sanitary or combined sewer discharge with local sewer district approval, if there is no other option.

v. Use of a sedimentation bag with discharge to a ditch or swale for small volumes of localized dewatering.

d. Permittees must handle highly turbid or contaminated dewatering water separately from stormwater.

11. Maintain BMPs

a. Permittees must maintain and repair all temporary and permanent erosion and sediment control BMPs as needed to assure continued performance of their intended function in accordance with BMP specifications.

b. Permittees must remove all temporary erosion and sediment control BMPs within 30 days after achieving final site stabilization or after the temporary BMPs are no longer needed.

12. Manage the Project

    a. Phase development projects to the maximum degree practicable and take into account seasonal work limitations.

    b. Inspect, maintain and repair all BMPs as needed to assure continued performance of their intended function. Conduct site inspections and monitoring in accordance with Special Condition S4.

    c. Maintain, update, and implement the SWPPP in accordance with Special Conditions S3, S4, and S9.

13. Protect Low Impact Development (LID) BMPs

    The primary purpose of on-site LID Stormwater Management is to reduce the disruption of the natural site hydrology through infiltration. LID BMPs are permanent facilities.

    a. Permittees must protect all LID BMPs (including, but not limited to, Bioretention and Rain Garden facilities) from sedimentation through installation and maintenance of erosion and sediment control BMPs on portions of the site that drain into the Bioretention and/or Rain Garden facilities. Restore the BMPs to their fully functioning condition if they accumulate sediment during construction. Restoring the facility must include removal of sediment and any sediment-laden bioretention/ rain garden soils, and replacing the removed soils with soils meeting the design specification.

    b. Permittees must maintain the infiltration capabilities of LID BMPs by protecting against compaction by construction equipment and foot traffic. Protect completed lawn and landscaped areas from compaction due to construction equipment.

    c. Permittees must control erosion and avoid introducing sediment from surrounding land uses onto permeable pavements. Do not allow muddy construction equipment on the base material or pavement. Do not allow sediment-laden runoff onto permeable pavements or base materials.

    d. Permittees must clean permeable pavements fouled with sediments or no longer passing an initial infiltration test using local stormwater manual methodology or the manufacturer's procedures.

    e. Permittees must keep all heavy equipment off existing soils under LID BMPs that have been excavated to final grade to retain the infiltration rate of the soils.

E. SWPPP – Map Contents and Requirements

The Permittee's SWPPP must also include a vicinity map or general location map (for example, a USGS quadrangle map, a portion of a county or city map, or other appropriate map) with enough detail to identify the location of the construction site and receiving waters within one mile of the site.

The SWPPP must also include a legible site map (or maps) showing the entire construction site. The following features must be identified, unless not applicable due to site conditions.

1. The direction of north, property lines, and existing structures and roads.

2. Cut and fill slopes indicating the top and bottom of slope catch lines.

3. Approximate slopes, contours, and direction of stormwater flow before and after major grading activities.

4. Areas of soil disturbance and areas that will not be disturbed.

5. Locations of structural and nonstructural controls (BMPs) identified in the SWPPP.

6. Locations of off-site material, stockpiles, waste storage, borrow areas, and vehicle/equipment storage areas.

7. Locations of all surface water bodies, including wetlands.

8. Locations where stormwater or non-stormwater discharges off-site and/or to a surface waterbody, including wetlands.

9. Location of water quality sampling station(s), if sampling is required by state or local permitting authority.

10. Areas where final stabilization has been accomplished and no further construction-phase permit requirements apply.

11. Location or proposed location of LID facilities.

S10. NOTICE OF TERMINATION

Partial terminations of permit coverage are not authorized.

A. The site is eligible for termination of coverage when it has met any of the following conditions:

1. The site has undergone final stabilization, the Permittee has removed all temporary BMPs (except biodegradable BMPs clearly manufactured with the intention for the material to be left in place and not interfere with maintenance or land use), and all stormwater discharges associated with construction activity have been eliminated; *or*

2. All portions of the site that have not undergone final stabilization per Special Condition S10.A.1 have been sold and/or transferred (per Special Condition S2.A), and the Permittee no longer has operational control of the construction activity; *or*

3. For residential construction only, the Permittee has completed temporary stabilization and the homeowners have taken possession of the residences.

B. When the site is eligible for termination, the Permittee must submit a complete and accurate Notice of Termination (NOT) form, signed in accordance with General Condition G2, to:

Department of Ecology
Water Quality Program - Construction Stormwater
PO Box 47696
Olympia, WA 98504-7696

When an electronic termination form is available, the Permittee may choose to submit a complete and accurate Notice of Termination (NOT) form through the Water Quality Permitting Portal rather than mailing a hardcopy as noted above.

The termination is effective on the 31st calendar day following the date Ecology receives a complete NOT form, unless Ecology notifies the Permittee that termination request is denied because the Permittee has not met the eligibility requirements in Special Condition S10.A.

Permittees are required to comply with all conditions and effluent limitations in the permit until the permit has been terminated.

Permittees transferring the property to a new property owner or operator/Permittee are required to complete and submit the Notice of Transfer form to Ecology, but are not required to submit a Notice of Termination form for this type of transaction.

GENERAL CONDITIONS

G1. DISCHARGE VIOLATIONS

All discharges and activities authorized by this general permit must be consistent with the terms and conditions of this general permit. Any discharge of any pollutant more frequent than or at a level in excess of that identified and authorized by the general permit must constitute a violation of the terms and conditions of this permit.

G2. SIGNATORY REQUIREMENTS

A. All permit applications must bear a certification of correctness to be signed:

1. In the case of corporations, by a responsible corporate officer.
2. In the case of a partnership, by a general partner of a partnership.
3. In the case of sole proprietorship, by the proprietor.
4. In the case of a municipal, state, or other public facility, by either a principal executive officer or ranking elected official.

B. All reports required by this permit and other information requested by Ecology (including NOIs, NOTs, and Transfer of Coverage forms) must be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

1. The authorization is made in writing by a person described above and submitted to Ecology.
2. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters.

C. Changes to authorization. If an authorization under paragraph G2.B.2 above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph G2.B.2 above must be submitted to Ecology prior to or together with any reports, information, or applications to be signed by an authorized representative.

D. Certification. Any person signing a document under this section must make the following certification:

I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

G3. RIGHT OF INSPECTION AND ENTRY

The Permittee must allow an authorized representative of Ecology, upon the presentation of credentials and such other documents as may be required by law:

A. To enter upon the premises where a discharge is located or where any records are kept under the terms and conditions of this permit.

B. To have access to and copy, at reasonable times and at reasonable cost, any records required to be kept under the terms and conditions of this permit.

C. To inspect, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, methods, or operations regulated or required under this permit.

D. To sample or monitor, at reasonable times, any substances or parameters at any location for purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act.

G4. GENERAL PERMIT MODIFICATION AND REVOCATION

This permit may be modified, revoked and reissued, or terminated in accordance with the provisions of Chapter 173-226 WAC. Grounds for modification, revocation and reissuance, or termination include, but are not limited to, the following:

A. When a change occurs in the technology or practices for control or abatement of pollutants applicable to the category of dischargers covered under this permit.

B. When effluent limitation guidelines or standards are promulgated pursuant to the CWA or Chapter 90.48 RCW, for the category of dischargers covered under this permit.

C. When a water quality management plan containing requirements applicable to the category of dischargers covered under this permit is approved, or

D. When information is obtained that indicates cumulative effects on the environment from dischargers covered under this permit are unacceptable.

G5. REVOCATION OF COVERAGE UNDER THE PERMIT

Pursuant to Chapter 43.21B RCW and Chapter 173-226 WAC, the Director may terminate coverage for any discharger under this permit for cause. Cases where coverage may be terminated include, but are not limited to, the following:

A. Violation of any term or condition of this permit.

B. Obtaining coverage under this permit by misrepresentation or failure to disclose fully all relevant facts.

C. A change in any condition that requires either a temporary or permanent reduction or elimination of the permitted discharge.

D. Failure or refusal of the Permittee to allow entry as required in RCW 90.48.090.

E. A determination that the permitted activity endangers human health or the environment, or contributes to water quality standards violations.

F. Nonpayment of permit fees or penalties assessed pursuant to RCW 90.48.465 and Chapter 173-224 WAC.

G. Failure of the Permittee to satisfy the public notice requirements of WAC 173-226-130(5), when applicable.

The Director may require any discharger under this permit to apply for and obtain coverage under an individual permit or another more specific general permit. Permittees who have their coverage revoked for cause according to WAC 173-226-240 may request temporary coverage under this permit during the time an individual permit is being developed, provided the request is made within ninety (90) days from the time of revocation and is submitted along with a complete individual permit application form.

G6. REPORTING A CAUSE FOR MODIFICATION

The Permittee must submit a new application, or a supplement to the previous application, whenever a material change to the construction activity or in the quantity or type of discharge is anticipated which is not specifically authorized by this permit. This application must be submitted at least sixty (60) days prior to any proposed changes. Filing a request for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not relieve the Permittee of the duty to comply with the existing permit until it is modified or reissued.

G7. COMPLIANCE WITH OTHER LAWS AND STATUTES

Nothing in this permit will be construed as excusing the Permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

G8. DUTY TO REAPPLY

The Permittee must apply for permit renewal at least 180 days prior to the specified expiration date of this permit. The Permittee must reapply using the electronic application form (NOI) available on Ecology's website. Permittees unable to submit electronically (for example, those who do not have an internet connection) must contact Ecology to request a waiver and obtain instructions on how to obtain a paper NOI.

Department of Ecology
Water Quality Program - Construction Stormwater
PO Box 47696
Olympia, WA 98504-7696

G9. REMOVED SUBSTANCE

The Permittee must not re-suspend or reintroduce collected screenings, grit, solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of stormwater to the final effluent stream for discharge to state waters.

G10. DUTY TO PROVIDE INFORMATION

The Permittee must submit to Ecology, within a reasonable time, all information that Ecology may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The Permittee must also submit to Ecology, upon request, copies of records required to be kept by this permit [40 CFR 122.41(h)].

G11. OTHER REQUIREMENTS OF 40 CFR

All other requirements of 40 CFR 122.41 and 122.42 are incorporated in this permit by reference.

G12. ADDITIONAL MONITORING

Ecology may establish specific monitoring requirements in addition to those contained in this permit by administrative order or permit modification.

G13. PENALTIES FOR VIOLATING PERMIT CONDITIONS

Any person who is found guilty of willfully violating the terms and conditions of this permit shall be deemed guilty of a crime, and upon conviction thereof shall be punished by a fine of up to ten thousand dollars ($10,000) and costs of prosecution, or by imprisonment at the discretion of the court. Each day upon which a willful violation occurs may be deemed a separate and additional violation.

Any person who violates the terms and conditions of a waste discharge permit shall incur, in addition to any other penalty as provided by law, a civil penalty in the amount of up to ten thousand dollars ($10,000) for every such violation. Each and every such violation shall be a separate and distinct offense, and in case of a continuing violation, every day's continuance shall be deemed to be a separate and distinct violation.

G14. UPSET

Definition – "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of the following paragraph are met.

A Permittee who wishes to establish the affirmative defense of upset must demonstrate, through properly signed, contemporaneous operating logs or other relevant evidence that: 1) an upset occurred and that the Permittee can identify the cause(s) of the upset; 2) the permitted facility was being properly operated at the time of the upset; 3) the Permittee submitted notice of the upset as required in Special Condition S5.F, and; 4) the Permittee complied with any remedial measures required under this permit.

In any enforcement proceeding, the Permittee seeking to establish the occurrence of an upset has the burden of proof.

G15. PROPERTY RIGHTS

This permit does not convey any property rights of any sort, or any exclusive privilege.

G16. DUTY TO COMPLY

The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

G17. TOXIC POLLUTANTS

The Permittee must comply with effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if this permit has not yet been modified to incorporate the requirement.

G18. PENALTIES FOR TAMPERING

The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than two years per violation, or by both. If a conviction of a person is for a violation committed after a first conviction of such person under this condition, punishment shall be a fine of not more than $20,000 per day of violation, or imprisonment of not more than four (4) years, or both.

G19. REPORTING PLANNED CHANGES

The Permittee must, as soon as possible, give notice to Ecology of planned physical alterations, modifications or additions to the permitted construction activity. The Permittee should be aware that, depending on the nature and size of the changes to the original permit, a new public notice and other permit process requirements may be required. Changes in activities that require reporting to Ecology include those that will result in:

A. The permitted facility being determined to be a new source pursuant to 40 CFR 122.29(b).

B. A significant change in the nature or an increase in quantity of pollutants discharged, including but not limited to: a 20% or greater increase in acreage disturbed by construction activity.

C. A change in or addition of surface water(s) receiving stormwater or non-stormwater from the construction activity.

D. A change in the construction plans and/or activity that affects the Permittee's monitoring requirements in Special Condition S4.

Following such notice, permit coverage may be modified, or revoked and reissued pursuant to 40 CFR 122.62(a) to specify and limit any pollutants not previously limited. Until such modification is effective, any new or increased discharge in excess of permit limits or not specifically authorized by this permit constitutes a violation.

G20. REPORTING OTHER INFORMATION

Where the Permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to Ecology, it must promptly submit such facts or information.

G21. REPORTING ANTICIPATED NON-COMPLIANCE

The Permittee must give advance notice to Ecology by submission of a new application or supplement thereto at least forty-five (45) days prior to commencement of such discharges, of any facility expansions, production increases, or other planned changes, such as process modifications, in the permitted facility or activity which may result in noncompliance with permit limits or conditions. Any maintenance of facilities, which might necessitate unavoidable interruption of

operation and degradation of effluent quality, must be scheduled during non-critical water quality periods and carried out in a manner approved by Ecology.

G22. REQUESTS TO BE EXCLUDED FROM COVERAGE UNDER THE PERMIT

Any discharger authorized by this permit may request to be excluded from coverage under the general permit by applying for an individual permit. The discharger must submit to the Director an application as described in WAC 173-220-040 or WAC 173-216-070, whichever is applicable, with reasons supporting the request. These reasons will fully document how an individual permit will apply to the applicant in a way that the general permit cannot. Ecology may make specific requests for information to support the request. The Director will either issue an individual permit or deny the request with a statement explaining the reason for the denial. When an individual permit is issued to a discharger otherwise subject to the construction stormwater general permit, the applicability of the construction stormwater general permit to that Permittee is automatically terminated on the effective date of the individual permit.

G23. APPEALS

A. The terms and conditions of this general permit, as they apply to the appropriate class of dischargers, are subject to appeal by any person within 30 days of issuance of this general permit, in accordance with Chapter 43.21B RCW, and Chapter 173-226 WAC.

B. The terms and conditions of this general permit, as they apply to an individual discharger, are appealable in accordance with Chapter 43.21B RCW within 30 days of the effective date of coverage of that discharger. Consideration of an appeal of general permit coverage of an individual discharger is limited to the general permit's applicability or nonapplicability to that individual discharger.

C. The appeal of general permit coverage of an individual discharger does not affect any other dischargers covered under this general permit. If the terms and conditions of this general permit are found to be inapplicable to any individual discharger(s), the matter shall be remanded to Ecology for consideration of issuance of an individual permit or permits.

G24. SEVERABILITY

The provisions of this permit are severable, and if any provision of this permit, or application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

G25. BYPASS PROHIBITED

A. Bypass Procedures

Bypass, which is the intentional diversion of waste streams from any portion of a treatment facility, is prohibited for stormwater events below the design criteria for stormwater management. Ecology may take enforcement action against a Permittee for bypass unless one of the following circumstances (1, 2, 3 or 4) is applicable.

1. Bypass of stormwater is consistent with the design criteria and part of an approved management practice in the applicable stormwater management manual.

2. Bypass for essential maintenance without the potential to cause violation of permit limits or conditions.

Bypass is authorized if it is for essential maintenance and does not have the potential to cause violations of limitations or other conditions of this permit, or adversely impact public health.

3. Bypass of stormwater is unavoidable, unanticipated, and results in noncompliance of this permit.

   This bypass is permitted only if:

   a. Bypass is unavoidable to prevent loss of life, personal injury, or severe property damage. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which would cause them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass.

   b. There are no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, maintenance during normal periods of equipment downtime (but not if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventative maintenance), or transport of untreated wastes to another treatment facility.

   c. Ecology is properly notified of the bypass as required in Special Condition S5.F of this permit.

4. A planned action that would cause bypass of stormwater and has the potential to result in noncompliance of this permit during a storm event.

   The Permittee must notify Ecology at least thirty (30) days before the planned date of bypass. The notice must contain:

   a. A description of the bypass and its cause

   b. An analysis of all known alternatives which would eliminate, reduce, or mitigate the need for bypassing.

   c. A cost-effectiveness analysis of alternatives including comparative resource damage assessment.

   d. The minimum and maximum duration of bypass under each alternative.

   e. A recommendation as to the preferred alternative for conducting the bypass.

   f. The projected date of bypass initiation.

   g. A statement of compliance with SEPA.

   h. A request for modification of water quality standards as provided for in WAC 173-201A-110, if an exceedance of any water quality standard is anticipated.

   i. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the bypass.

5. For probable construction bypasses, the need to bypass is to be identified as early in the planning process as possible. The analysis required above must be considered during

preparation of the Stormwater Pollution Prevention Plan (SWPPP) and must be included to the extent practical. In cases where the probable need to bypass is determined early, continued analysis is necessary up to and including the construction period in an effort to minimize or eliminate the bypass.

Ecology will consider the following before issuing an administrative order for this type bypass:

a. If the bypass is necessary to perform construction or maintenance-related activities essential to meet the requirements of this permit.

b. If there are feasible alternatives to bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, stopping production, maintenance during normal periods of equipment down time, or transport of untreated wastes to another treatment facility.

c. If the bypass is planned and scheduled to minimize adverse effects on the public and the environment.

After consideration of the above and the adverse effects of the proposed bypass and any other relevant factors, Ecology will approve, conditionally approve, or deny the request. The public must be notified and given an opportunity to comment on bypass incidents of significant duration, to the extent feasible. Approval of a request to bypass will be by administrative order issued by Ecology under RCW 90.48.120.

B. Duty to Mitigate

The Permittee is required to take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

APPENDIX A – DEFINITIONS

AKART is an acronym for "**A**ll **K**nown, **A**vailable, and **R**easonable methods of prevention, control, and **T**reatment." AKART represents the most current methodology that can be reasonably required for preventing, controlling, or abating the pollutants and controlling pollution associated with a discharge.

Applicable TMDL means a TMDL for turbidity, fine sediment, high pH, or phosphorus, which was completed and approved by EPA before January 1, 2021, or before the date the operator's complete permit application is received by Ecology, whichever is later. TMDLs completed after a complete permit application is received by Ecology become applicable to the Permittee only if they are imposed through an administrative order by Ecology, or through a modification of permit coverage.

Applicant means an *operator* seeking coverage under this permit.

Benchmark means a pollutant concentration used as a permit threshold, below which a pollutant is considered unlikely to cause a water quality violation, and above which it may. When pollutant concentrations exceed benchmarks, corrective action requirements take effect. Benchmark values are not water quality standards and are not numeric effluent limitations; they are indicator values.

Best Management Practices (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control stormwater associated with construction activity, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Buffer means an area designated by a local jurisdiction that is contiguous to and intended to protect a sensitive area.

Bypass means the intentional diversion of waste streams from any portion of a treatment facility.

Calendar Day A period of 24 consecutive hours starting at 12:00 midnight and ending the following 12:00 midnight.

Calendar Week (same as **Week**) means a period of seven consecutive days starting at 12:01 a.m. (0:01 hours) on Sunday.

Certified Erosion and Sediment Control Lead (CESCL) means a person who has current certification through an approved erosion and sediment control training program that meets the minimum training standards established by Ecology (See BMP C160 in the SWMM).

Chemical Treatment means the addition of chemicals to stormwater and/or authorized non-stormwater prior to filtration and discharge to surface waters.

Clean Water Act (CWA) means the Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, and 97-117; USC 1251 et seq.

Combined Sewer means a sewer which has been designed to serve as a sanitary sewer and a storm sewer, and into which inflow is allowed by local ordinance.

Common Plan of Development or Sale means a site where multiple separate and distinct construction activities may be taking place at different times on different schedules and/or by different contractors, but still under a single plan. Examples include: 1) phased projects and projects with multiple filings or lots, even if the separate phases or filings/lots will be constructed under separate contract or by separate owners (e.g., a development where lots are sold to separate builders); 2) a development plan that may be phased over multiple years, but is still under a consistent plan for long-term development; 3) projects in a contiguous area that may be unrelated but still under the same contract, such as construction of a building extension and a new parking lot at the same facility; and 4) linear projects such as roads, pipelines, or utilities. If the project is part of a common plan of development or sale, the disturbed area of the entire plan must be used in determining permit requirements.

Composite Sample means a mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increases while maintaining a constant time interval between the aliquots.

Concrete Wastewater means any water used in the production, pouring and/or clean-up of concrete or concrete products, and any water used to cut, grind, wash, or otherwise modify concrete or concrete products. Examples include water used for or resulting from concrete truck/mixer/pumper/tool/chute rinsing or washing, concrete saw cutting and surfacing (sawing, coring, grinding, roughening, hydro-demolition, bridge and road surfacing). When stormwater comingles with concrete wastewater, the resulting water is considered concrete wastewater and must be managed to prevent discharge to waters of the State, including groundwater.

Construction Activity means land disturbing operations including clearing, grading or excavation which disturbs the surface of the land (including off-site disturbance acreage related to construction-support activity). Such activities may include road construction, construction of residential houses, office buildings, or industrial buildings, site preparation, soil compaction, movement and stockpiling of topsoils, and demolition activity.

Construction Support Activity means off-site acreage that will be disturbed as a direct result of the construction project and will discharge stormwater. For example, off-site equipment staging yards, material storage areas, borrow areas, and parking areas.

Contaminant means any hazardous substance that does not occur naturally or occurs at greater than natural background levels. See definition of “hazardous substance” and WAC 173-340-200.

Contaminated soil means soil which contains contaminants, pollutants, or hazardous substances that do not occur naturally or occur at levels greater than natural background.

Contaminated groundwater means groundwater which contains contaminants, pollutants, or hazardous substances that do not occur naturally or occur at levels greater than natural background.

Demonstrably Equivalent means that the technical basis for the selection of all stormwater BMPs is documented within a SWPPP, including:

1. The method and reasons for choosing the stormwater BMPs selected.
2. The pollutant removal performance expected from the BMPs selected.

3. The technical basis supporting the performance claims for the BMPs selected, including any available data concerning field performance of the BMPs selected.
4. An assessment of how the selected BMPs will comply with state water quality standards.
5. An assessment of how the selected BMPs will satisfy both applicable federal technology-based treatment requirements and state requirements to use all known, available, and reasonable methods of prevention, control, and treatment (AKART).

Department means the Washington State Department of Ecology.

Detention means the temporary storage of stormwater to improve quality and/or to reduce the mass flow rate of discharge.

Dewatering means the act of pumping groundwater or stormwater away from an active construction site.

Director means the Director of the Washington State Department of Ecology or his/her authorized representative.

Discharger means an owner or operator of any facility or activity subject to regulation under Chapter 90.48 RCW or the Federal Clean Water Act.

Domestic Wastewater means water carrying human wastes, including kitchen, bath, and laundry wastes from residences, buildings, industrial establishments, or other places, together with such groundwater infiltration or surface waters as may be present.

Ecology means the Washington State Department of Ecology.

Engineered Soils means the use of soil amendments including, but not limited, to Portland cement treated base (CTB), cement kiln dust (CKD), or fly ash to achieve certain desirable soil characteristics.

Equivalent BMPs means operational, source control, treatment, or innovative BMPs which result in equal or better quality of stormwater discharge to surface water or to groundwater than BMPs selected from the SWMM.

Erosion means the wearing away of the land surface by running water, wind, ice, or other geological agents, including such processes as gravitational creep.

Erosion and Sediment Control BMPs means BMPs intended to prevent erosion and sedimentation, such as preserving natural vegetation, seeding, mulching and matting, plastic covering, filter fences, sediment traps, and ponds. Erosion and sediment control BMPs are synonymous with stabilization and structural BMPs.

Federal Operator is an entity that meets the definition of "Operator" in this permit and is either any department, agency or instrumentality of the executive, legislative, and judicial branches of the Federal government of the United States, or another entity, such as a private contractor, performing construction activity for any such department, agency, or instrumentality.

Final Stabilization (same as **fully stabilized** or **full stabilization**) means the completion of all soil disturbing activities at the site and the establishment of permanent vegetative cover, or equivalent permanent stabilization measures (such as pavement, riprap, gabions, or geotextiles) which will prevent erosion. See the applicable Stormwater Management Manual for more information on vegetative cover expectations and equivalent permanent stabilization measures.

Groundwater means water in a saturated zone or stratum beneath the land surface or a surface waterbody.

Hazardous Substance means any dangerous or extremely hazardous waste as defined in RCW 70.105.010 (5) and (6), or any dangerous or extremely dangerous waste as designated by rule under chapter 70.105 RCW; any hazardous sub-stance as defined in RCW 70.105.010(14) or any hazardous substance as defined by rule under chapter 70.105 RCW; any substance that, on the effective date of this section, is a hazardous substance under section 101(14) of the federal cleanup law, 42U.S.C., Sec. 9601(14); petroleum or petroleum products; and any substance or category of substances, including solid waste decomposition products, determined by the director by rule to present a threat to human health or the environment if released into the environment. The term hazardous substance does not include any of the following when contained in an underground storage tank from which there is not a release: crude oil or any fraction thereof or petroleum, if the tank is in compliance with all applicable federal, state, and local law.

Injection Well means a well that is used for the subsurface emplacement of fluids. (See **Well**.)

Jurisdiction means a political unit such as a city, town or county; incorporated for local self-government.

National Pollutant Discharge Elimination System (NPDES) means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring, and enforcing permits, and imposing and enforcing pretreatment requirements, under sections 307, 402, 318, and 405 of the Federal Clean Water Act, for the discharge of pollutants to surface waters of the State from point sources. These permits are referred to as NPDES permits and, in Washington State, are administered by the Washington State Department of Ecology.

Notice of Intent (NOI) means the application for, or a request for coverage under this general permit pursuant to WAC 173-226-200.

Notice of Termination (NOT) means a request for termination of coverage under this general permit as specified by Special Condition S10 of this permit.

Operator means any party associated with a construction project that meets either of the following two criteria:

- The party has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or
- The party has day-to-day operational control of those activities at a project that are necessary to ensure compliance with a SWPPP for the site or other permit conditions (e.g., they are authorized to direct workers at a site to carry out activities required by the SWPPP or comply with other permit conditions).

Permittee means individual or entity that receives notice of coverage under this general permit.

pH means a liquid's measure of acidity or alkalinity. A pH of 7 is defined as neutral. Large variations above or below this value are considered harmful to most aquatic life.

pH Monitoring Period means the time period in which the pH of stormwater runoff from a site must be tested a minimum of once every seven days to determine if stormwater pH is between 6.5 and 8.5.

Point Source means any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, and container from which pollutants are or may be discharged to surface waters of the State. This term does not include return flows from irrigated agriculture. (See the Fact Sheet for further explanation)

Pollutant means dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, domestic sewage sludge (biosolids), munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste. This term does not include sewage from vessels within the meaning of section 312 of the CWA, nor does it include dredged or fill material discharged in accordance with a permit issued under section 404 of the CWA.

Pollution means contamination or other alteration of the physical, chemical, or biological properties of waters of the State; including change in temperature, taste, color, turbidity, or odor of the waters; or such discharge of any liquid, gaseous, solid, radioactive or other substance into any waters of the State as will or is likely to create a nuisance or render such waters harmful, detrimental or injurious to the public health, safety or welfare; or to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses; or to livestock, wild animals, birds, fish or other aquatic life.

Process Wastewater means any non-stormwater which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product. If stormwater commingles with process wastewater, the commingled water is considered process wastewater.

Receiving Water means the waterbody at the point of discharge. If the discharge is to a storm sewer system, either surface or subsurface, the receiving water is the waterbody to which the storm system discharges. Systems designed primarily for other purposes such as for groundwater drainage, redirecting stream natural flows, or for conveyance of irrigation water/return flows that coincidentally convey stormwater are considered the receiving water.

Representative means a stormwater or wastewater sample which represents the flow and characteristics of the discharge. Representative samples may be a grab sample, a time-proportionate *composite sample*, or a flow proportionate sample. Ecology's Construction Stormwater Monitoring Manual provides guidance on representative sampling.

Responsible Corporate Officer for the purpose of signatory authority means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

Sanitary Sewer means a sewer which is designed to convey domestic wastewater.

Sediment means the fragmented material that originates from the weathering and erosion of rocks or unconsolidated deposits, and is transported by, suspended in, or deposited by water.

Sedimentation means the depositing or formation of sediment.

Sensitive Area means a waterbody, wetland, stream, aquifer recharge area, or channel migration zone.

SEPA (State Environmental Policy Act) means the Washington State Law, RCW 43.21C.020, intended to prevent or eliminate damage to the environment.

Significant Amount means an amount of a pollutant in a discharge that is amenable to available and reasonable methods of prevention or treatment; or an amount of a pollutant that has a reasonable potential to cause a violation of surface or groundwater quality or sediment management standards.

Significant Concrete Work means greater than 1000 cubic yards placed or poured concrete or recycled concrete used over the life of a project.

Significant Contributor of Pollutants means a facility determined by Ecology to be a contributor of a significant amount(s) of a pollutant(s) to waters of the State of Washington.

Site means the land or water area where any "facility or activity" is physically located or conducted.

Source Control BMPs means physical, structural or mechanical devices or facilities that are intended to prevent pollutants from entering stormwater. A few examples of source control BMPs are erosion control practices, maintenance of stormwater facilities, constructing roofs over storage and working areas, and directing wash water and similar discharges to the sanitary sewer or a dead end sump.

Stabilization means the application of appropriate BMPs to prevent the erosion of soils, such as, temporary and permanent seeding, vegetative covers, mulching and matting, plastic covering and sodding. See also the definition of Erosion and Sediment Control BMPs.

Storm Drain means any drain which drains directly into a *storm sewer system*, usually found along roadways or in parking lots.

Storm Sewer System means a means a conveyance, or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains designed or used for collecting or conveying stormwater. This does not include systems which are part of *a combined sewer* or Publicly Owned Treatment Works (POTW), as defined at 40 CFR 122.2.

Stormwater means that portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a stormwater drainage system into a defined surface waterbody, or a constructed infiltration facility.

Stormwater Management Manual (SWMM) or **Manual** means the technical Manual published by Ecology for use by local governments that contain descriptions of and design criteria for BMPs to prevent, control, or treat pollutants in stormwater.

Stormwater Pollution Prevention Plan (SWPPP) means a documented plan to implement measures to identify, prevent, and control the contamination of point source discharges of stormwater.

Surface Waters of the State includes lakes, rivers, ponds, streams, inland waters, salt waters, and all other surface waters and water courses within the jurisdiction of the state of Washington.

Temporary Stabilization means the exposed ground surface has been covered with appropriate materials to provide temporary stabilization of the surface from water or wind erosion. Materials include, but are not limited to, mulch, riprap, erosion control mats or blankets and temporary cover crops. Seeding alone is not considered stabilization. Temporary stabilization is not a substitute for the more permanent “final stabilization.”

Total Maximum Daily Load (TMDL) means a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet state water quality standards. Percentages of the total maximum daily load are allocated to the various pollutant sources. A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. The TMDL calculations must include a "margin of safety" to ensure that the waterbody can be protected in case there are unforeseen events or unknown sources of the pollutant. The calculation must also account for seasonable variation in water quality.

Transfer of Coverage (TOC) means a request for transfer of coverage under this general permit as specified by Special Condition S2.A of this permit.

Treatment BMPs means BMPs that are intended to remove pollutants from stormwater. A few examples of treatment BMPs are detention ponds, oil/water separators, biofiltration, and constructed wetlands.

Transparency means a measurement of water clarity in centimeters (cm), using a 60 cm transparency tube. The transparency tube is used to estimate the relative clarity or transparency of water by noting the depth at which a black and white Secchi disc becomes visible when water is released from a value in the bottom of the tube. A transparency tube is sometimes referred to as a “turbidity tube.”

Turbidity means the clarity of water expressed as nephelometric turbidity units (NTUs) and measured with a calibrated turbidimeter.

Uncontaminated means free from any contaminant. See definition of “contaminant” and WAC 173-340-200.

Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

Waste Load Allocation (WLA) means the portion of a receiving water’s loading capacity that is allocated to one of its existing or future point sources of pollution. WLAs constitute a type of water quality based effluent limitation (40 CFR 130.2[h]).

Water-Only Based Shaft Drilling is a shaft drilling process that uses water only and no additives are involved in the drilling of shafts for construction of building, road, or bridge foundations.

Water Quality means the chemical, physical, and biological characteristics of water, usually with respect to its suitability for a particular purpose.

Waters of the State includes those waters as defined as "waters of the United States" in 40 CFR Subpart 122.2 within the geographic boundaries of Washington State and "waters of the State" as defined in Chapter 90.48 RCW, which include lakes, rivers, ponds, streams, inland waters, underground waters, salt

waters, and all other surface waters and water courses within the jurisdiction of the state of Washington.

Well means a bored, drilled or driven shaft, or dug hole whose depth is greater than the largest surface dimension. (See **Injection Well**.)

Wheel Wash Wastewater means any water used in, or resulting from the operation of, a tire bath or wheel wash (BMP C106: Wheel Wash), or other structure or practice that uses water to physically remove mud and debris from vehicles leaving a construction site and prevent track-out onto roads. When stormwater comingles with wheel wash wastewater, the resulting water is considered wheel wash wastewater and must be managed according to Special Condition S9.D.9.

APPENDIX B – ACRONYMS

AKART	All Known, Available, and Reasonable Methods of Prevention, Control, and Treatment
BMP	Best Management Practice
CESCL	Certified Erosion and Sediment Control Lead
CFR	Code of Federal Regulations
CKD	Cement Kiln Dust
cm	Centimeters
CPD	Common Plan of Development
CTB	Cement-Treated Base
CWA	Clean Water Act
DMR	Discharge Monitoring Report
EPA	Environmental Protection Agency
ERTS	Environmental Report Tracking System
ESC	Erosion and Sediment Control
FR	Federal Register
LID	Low Impact Development
NOI	Notice of Intent
NOT	Notice of Termination
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric Turbidity Unit
RCW	Revised Code of Washington
SEPA	State Environmental Policy Act
SWMM	Stormwater Management Manual
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
UIC	Underground Injection Control
USC	United States Code
USEPA	United States Environmental Protection Agency
WAC	Washington Administrative Code
WQ	Water Quality
WWHM	Western Washington Hydrology Model

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APPENDIX D

PSE UTILITY POWER DESIGN

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Nathanael Palmatier

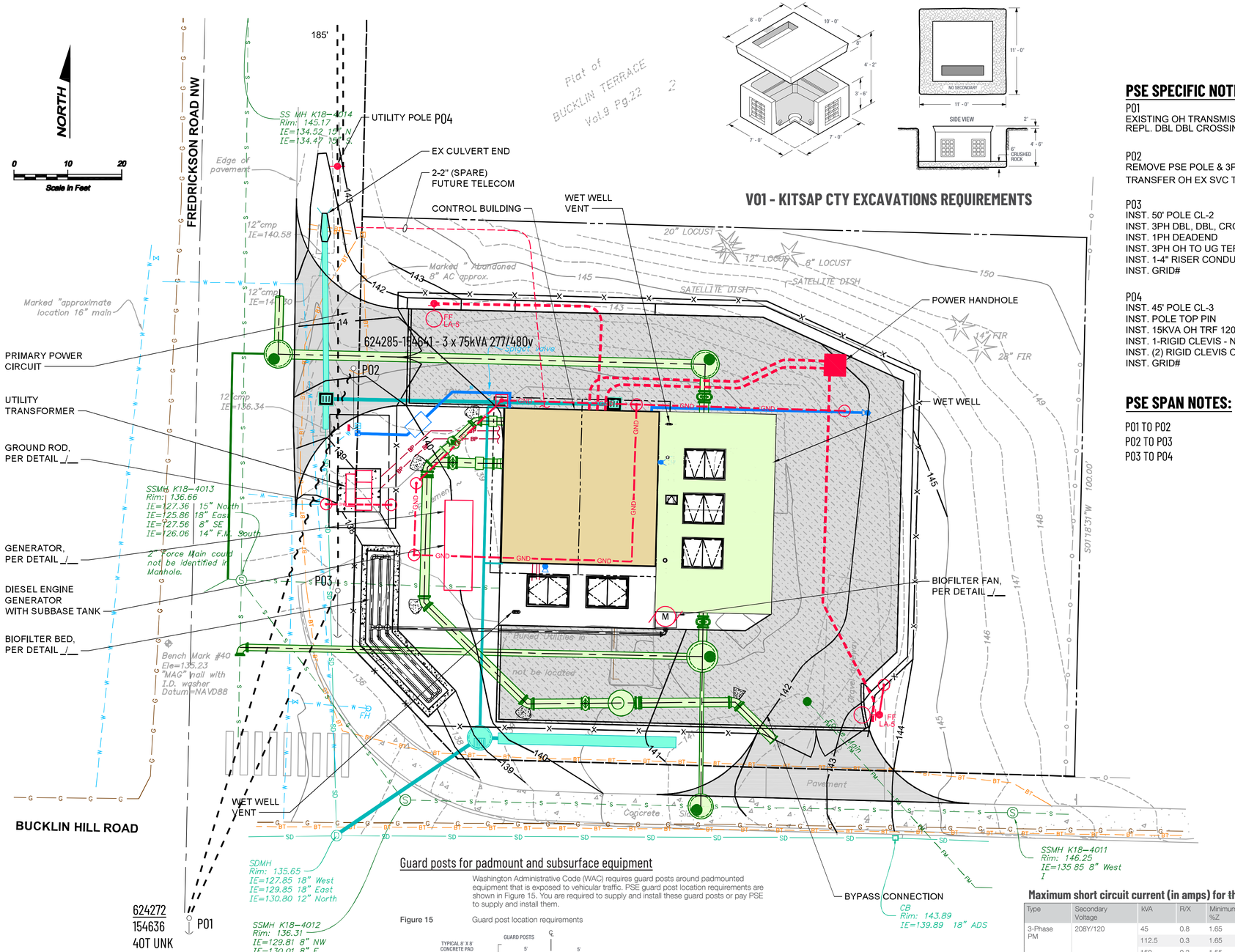
From: Ibarra, Victor <Victor.Ibarra@pse.com>
Sent: Monday, April 4, 2022 3:15 PM
To: 'Floyd Bayless'; Nathanael Palmatier; Nathanael Palmatier
Cc: Wilmart, Ian; Palmerton, Monica - EASi; Davila, Benjamin
Subject: RE: PSE TRACKING# 512649668 - 9606 FREDRICKSON RD NW # STA4, BREMERTON
Attachments: KCPW PRELIMINARY DESIGN.pdf

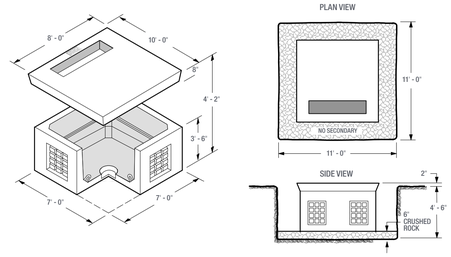
Job Tracking:
Next Step – Request for a Power Crew schedule, notify KCPW & electrical contractors, & leadership..
Next Step – Request for a PSE meterman to inspected the 1200amp 277/480v commercial meter base, once the meter is approve PSE meterman will notify PSE PM..
Next Step – KCPW Electrician will notify PSE PM, once the new 1200amp commercial meter is in place, just an reminder make sure to have a LNI approve sticker & phenolic label.
Next Step – Request for concrete vault delivery with KCPW contractors on-site to set…
Next Step – Pre-con meeting to go over the excavation requirements on-site and bollards requirements.
Next Step – PSE DocuSign Cost to KCPW
Next Step – Resend PSE approved cost letters & PSE design to KCPW
Next Step – Request for a Kitsap County Permit
Next Step – Request for Traffic Control Plans, with our PSE TCP department.
Next Step – Waiting on my senior project manager approve the redesign and costs.
Next Step – I've sent out Traffic Control Plans requests with the PSE TCP department.
Next Step – Send to PSE engineering verify design and costs.
Next Step – Re-measure overhead primary footage for the new pole placement locations at P03 & P04..

Next Step – The PSE PM will need an email back from the KCPW approval first, before moving to the next step.
Note to Customer: Based on your PSE application is official notice to Puget Sound Energy (PSE) to begin all the needed steps to provide you with new electric service. If any of the above information
is revised you may be responsible for additional charges related to engineering, construction, or other aspects of providing service. If there is a lack of progress or inactivity on your project
and this project is canceled either by you or by PSE, you will be responsible for paying PSE actual costs incurred up to the time of cancellation.

04-05-22 – Sent preliminary design to KCPW & Nathanael Palmatier..
03-22-22 – Site Visit with KCPW / Floyd Bayless, email address fbayless@co.kitsap.wa.us.
03-04-22 – Reassigned to Vic Ibarra, requested by Errol Burgos.

Victor Ibarra
victor.ibarra@pse.com
Puget Sound Energy
Customer and System Projects
6522 Kitsap Way
Bremerton WA 98312
1-425-429-4574





V01 - KITSAP CTY EXCAVATIONS REQUIREMENTS

PSE SPECIFIC NOTES:

P01
EXISTING OH TRANSMISSION POLE
REPL. DBL DBL CROSSING ARM

P02
REMOVE PSE POLE & 3PH 225KVA OH TRF BANK 120/480V
TRANSFER OH EX SVC TO P04

P03
INST. 50' POLE CL-2
INST. 3PH DBL, DBL, CROSSARM DEADEND
INST. 1PH DEADEND
INST. 3PH OH TO UG TERMINATION SWITCH
INST. 1-4" RISER CONDUIT
INST. GRID#

P04
INST. 45' POLE CL-3
INST. POLE TOP PIN
INST. 15KVA OH TRF 120/240V
INST. 1-RIGID CLEVIS - NEUTRAL
INST. (2) RIGID CLEVIS OH HSE 9607 & 9640
INST. GRID#

PSE SPAN NOTES:

P01 TO P02
P02 TO P03
P03 TO P04

Phenolic Nameplate requirement on the new 600amp 277/480v meter base.

• Meter base/sockets shall be permanently labeled to indicate the address they serve. PSE requires engraved phenolic nameplates or adhesive die-cut labels at least 1 inch high and lettering a minimum of 3/4 inches high. Service will not be established until marking is complete.

NOTE: Felt-tip pens and label maker tape are not considered permanent marking.

Table 8 Single-phase (nonresidential only) and all three-phase meter base/socket types

Voltage	Wires	Service Capacity Amp	No. of Terminals	Meter Socket Config.*	Manual Block Bypass Required?	Accessible Disconnect Ahead & Safety Socket Required?	Socket
Single-Phase Nonresidential							
120/240	3	up to 200	4	A	Yes	No	Self-contained socket
120/240	3	201 to 320	4	A	Yes	No	Self-contained 320 A socket
120/240	3	above 320	6	B	n/a	n/a	Instrument transformer rated with provision for test switch
120/208	3	up to 200	5	C	Yes	No	Preferred arrangement
120/240	3	up to 200	5	C	Yes	Safety socket allowed but not required	Streetlight applications only
240/480	3	up to 200	5	C	Yes	Yes - fused disconnect preferred	Streetlight applications only
All Three-Phase							
120/208	4	up to 200	7	D	Yes	No	Self-contained socket
120/208	4	above 200	13	E	n/a	n/a	Instrument transformer rated with provision for test switch
120/240	4	up to 200	7	D	Yes	No	Self-contained socket (RESTRICTED APPLICATION) — High leg on right terminals
120/240	4	above 200	13	E	n/a	n/a	Instrument transformer rated with provision for test switch (RESTRICTED APPLICATION)
277/480	4	up to 200	7	D	Yes	Yes - fused disconnect preferred	Self-contained safety socket
277/480	4	above 200	13	E	n/a	n/a	Instrument transformer rated with provision for test switch

* Meter Base/Socket Configurations

FOREMAN (CHECK BOX WHEN COMPLETED)

- ☐ PSE Equipment LOCKED/SECURED & Work Area left in CLEAN/SAFE Condition.
- ☐ Grid, Cable, and Switch numbers INSTALLED & VERIFIED.
- ☐ Field Changes RED-LINED on As-built.
- ☐ Material VERIFIED and CHANGES noted on Paperwork.
- ☐ Total PRIMARY Cable noted on As-built.
- ☐ Company ID#'s RECORDED in correct location on As-built.
- ☐ Indicate correct FUSE SIZE on As-built & VERIFY proper PHASE.
- ☐ Deviations noted on the As-built and their reason.

☐ I certify that the work performed meets PSE's standards and procedures and that all quality requirements are met.

Foreman's Signature _____

Print Name _____ Date _____

PROJECT PHASE	NOTIF#	ORDER#
PWR Superior	512649668	*
Perm. Service	*	*
Metering		*
GAS Distribution	N/A	N/A
Service Stubs	N/A	N/A
HP Svc/MSA	N/A	N/A
CABLE TV		
PHONE		

Vicinity Map

Owner / Developer Contact Info

PRELIMINARY DESIGN

Project Manager Contact Information:

Manager: Victor Ibarra
Cell Phone: 425-429-4574
E-Mail: victor.ibarra@pse.com

PSE Locates Required	YES
Customer Locates Required	YES
Outages Required	YES
Flagging Required	YES

CALL (800) 424-5555
2 BUSINESS DAYS BEFORE YOU DIG
THIS SKETCH NOT TO BE RELIED UPON FOR EXACT LOCATION OF EXISTING FACILITIES

REAL ESTATE/EASEMENT	PERMIT
N/A	Kitsap County Permit

REV#	DATE	BY	DESCRIPTION
3	.	.	.
2	.	.	.
1	.	.	.

COUNTY	Emer Sect	Gas Wk Ctr	POWER WK CTR
KITSAP	N/A	N/A	QSSPE
1/4 SEC	OP MAP		PLAT MAP
25 - 01E - S16	N/A		N/A
U-MAP NO (POWER)	OH CKT MAP	UG CKT MAP	CIRCUIT NO
2501E064	2501E088	2501E064	BHL-16

FUNCTION	CONTACT	PHONE NO	DATE
PROJECT MGR	VIC IBARRA	425-429-4574	03-04
ENGR - POWER	VIC IBARRA	425-429-4574	03-22
ENGR - GAS			
DRAWN BY	VIC IBARRA	425-429-4574	04-04
CHECKED BY			
APPROVED BY			
FOREMAN #1			
FOREMAN #2			
MAPPING			

JOINT FACILITIES ARRANGEMENTS

UTILITIES	COMCAST	CENTURY LINK	CASCADE NATURAL GAS
CONTACT	JIM LECOMPTE	RAY JONES	-
PHONE#	253.896.5688	253.313.3666	-

PSE PUGET SOUND ENERGY
DESIGNED BY

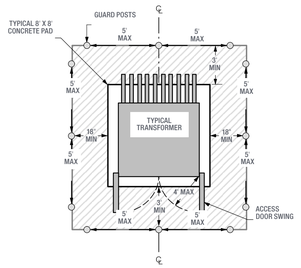
KCPW
Rpl B/O Pole, RMV OH Facilities, Inst. 3PH LE &
Modify EX. UG SEC SVC
9606 FREDRICKSON RD NW, STA4,
BREMERTON WA

INCIDENT	MAOP
N/A	N/A
Gas Order	Elect Order
N/A	105
SCALE	PAGE
1" = 50'	01 / 03

Guard posts for padmount and subsurface equipment

Washington Administrative Code (WAC) requires guard posts around padmounted equipment that is exposed to vehicular traffic. PSE guard post location requirements are shown in Figure 15. You are required to supply and install these guard posts or pay PSE to supply and install them.

Figure 15 Guard post location requirements



NOTE: Installation of guard posts must be completed before the primary cable is installed and energized.

PSE SPECIFIC NOTES:

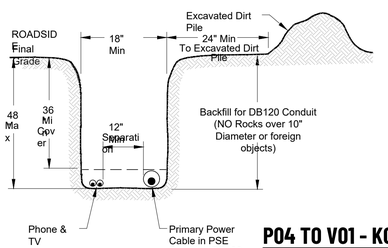
V01
INST. 3PH VAULT
INST. 750KVA 277/480v
inst. (3) ELBOWS

PSE SPAN NOTES:

P04 TO V01

Maximum short circuit current (in amps) for three-phase

Type	Secondary Voltage	kVA	R/X	Minimum %Z	3 Phase &/or L-G Fault Current
3-Phase PM	208Y/120	45	0.8	1.65	7600
		112.5	0.3	1.65	19000
		150	0.3	1.55	26900
		225	0.2	2.15	29100
		300	0.3	2.10	39700
		500	0.2	2.30	60300
		750	0.1	5.30	39300
		1000	0.1	5.30	52400
	480Y/277	45	0.8	1.65	3300
		112.5	0.3	1.65	8200
		150	0.3	1.55	11600
		225	0.2	2.15	12600
		300	0.3	2.10	17200
		500	0.2	2.30	26100
		750	0.1	5.30	17000
		1000	0.1	5.30	22700
		1500	0.1	5.30	34000
		2000	0.1	5.30	45400
		2500	0.1	5.30	56700



P04 TO V01 - KCPW TRENCH DETAIL

Primary-Schedule 40 (NTS)

APPENDIX E

MANUFACTURER'S BUDGETARY PRICE FOR SUBMERSIBLE WASTEWATER PUMPS

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WECI
Whitney Equipment Company, Inc

16120 Woodinville-Redmond Road NE, Suite 3
Woodinville, WA 98072 Phone: (425) 486-9499

2501 Columbia Way Suite 300
Vancouver, WA 98661 Phone: (360) 694-9175

8/17/2022 **Quote #: 38871 - 0**

To: BHC Consultants
Attn: Tony Fisher
Email: tony.fisher@bhcconsultants.com
Phone: 206-505-3400

Project Name: Kitsap County PS 4 upgrades

The following is Whitney Equipment Company's proposal for equipment we can furnish for the above referenced project. A detailed list of the equipment and services included in this proposal is shown in the following Scope of Supply. Only items listed in the Scope of Supply are included in this proposal. This proposal is valid for 30 days from the date listed above. Please contact us to verify pricing and availability beyond 30 days as pricing and availability may vary. The conditions of sale associated with this proposal are attached.

Engineering calculations and design services are included only when specifically listed in the Scope of Supply. Field or startup services are not included unless specifically listed in the Scope of Supply. If additional field or onsite assistance is needed beyond what is included in the Scope of Supply, it can be supplied at a rate of $165.00/hour at the job site, plus travel time and expense. Unless specifically listed in the following Scope of Supply, we do not include haulage, unloading including provision of lifting equipment, permits, bonds, insurance, installation, sales or use taxes or duties of any kind, power, chemicals, water, concrete, grout, anchor bolts, controls, wire, conduit, lights, fans, piping, valves, fittings, drains, meters, gauges, signs, safety equipment, labor, tools, field paint, lubricants, or any other items not listed as included.

Prices are firm for 30 days. Purchaser must also pay any costs incurred for additional field or onsite assistance no later than 30 days after receipt of an invoice for field or onsite services from Whitney Equipment Company.

The equipment will be coated with the manufacturers' standard preparation and coatings unless special coatings are listed in the Scope of Supply. Equipment will be prepared for shipment per the manufacturers' standard packing procedure. The purchaser is responsible for receiving all items including promptly inspecting for damage, noting damages, and filing for all missing or damaged items in a timely manner. Freight shall be standard ground or ocean freight unless otherwise listed. The purchaser is responsible for proper storage and handling of the equipment per the manufacturer's recommendations prior to installation to ensure warranty coverage. Warranty coverage shall be manufacturer's standard warranty unless specifically listed in the Scope of Supply.

This job is being handled by Brad Vande Vusse, phone 425-439-5809. Please call if you need further information or prices.

SCOPE OF SUPPLY

Hi Tony. We are pleased to offer you the following budgetary quote for the PS upgrade project. I understand our target flow rate is 5,100 gpm at 124 ft TDH. Please be aware that these are strictly budgetary numbers and the price may be different at time of purchase.

3 each	**NP 3315.095 MT 3 634 Flygt 3315 MT 3** Flygt NP 3315.095 MT. 634 hard-iron impeller. 140 hp, 460 V, 3 phase standard efficiency motor. FM (explosion proof) and FLS (fluid-leak sensor). 50 ft SUBCAB cable. Stainless steel cooling jacket.
3 each	**6045905 10x10" discharge elbow**
3 each	**14-407097 & 14-407129 Mini-Cas and Socket**
1 each	**62000900 Grip-Eye**
3 each	**40' LCA 40' Lifting Chain**
3 each	**U4C GAA FA 3" 304SS upper guide bar bracket**
3 each	**U4D GFA FA 3"x10" intermediate guide bar bracket**
3 each	**J6A Cable Holder**
1 each	**3" 304 SS guide rails** 160 ft. (20 ft. sections)
3 each	**ZCS1989 316 SS Cable grips**
1 each	**Start-up and training** One day start-up and training with WECI tech.

TOTAL **$520,000.00**

Lead Times: 16-20 weeks ARO
Freight Terms: FOB Factory, prepaid and added to invoice

Sales tax is not included unless specified.
Payment Terms: Net 30

Sincerely,
Brad Vande Vusse, Municipal Account Manager Washington

Purchaser's Signature: By signing below, I certify that I am an authorized representative with the authority to enter into contracts on behalf of the company identified below, and that I accept the terms included with this proposal.

_____	_____
Signature Date	Print Name and Title
BILL TO	SHIP TO
_____	_____
Company or Organization Bill To	Company or Organization Ship To
_____	_____
Bill To Address	Ship To Address
_____	_____
City/State/Zip	City/State/Zip
_____	_____
Billing Contact Name	Shipping Contact Name
_____	_____
Billing Contact Email	Shipping Contact Email
_____	_____
Billing Contact Phone Number	Shipping Contact Phone Number

PO # if applicable _____

If using a Purchase Order:
Make PO out to
Whitney Equipment Company Inc
16120 Woodinville Redmond Rd NE #3
Woodinville, WA 98072
Email: sales@weci.com

WHITNEY EQUIPMENT CO., INC.
WOODINVILLE, WA
STANDARD CONDITONS OF SALE

These are Whitney Equipment Co., Inc., the Seller, Standard Terms and Conditions and the basis of our offer to the Buyer, unless specifically altered in writing as permitted herein. Any changes may affect the quoted price. These Standard Terms and Conditions and the bid quote, purchase order, or other order form to which they are attached (the "Bid Quote") form a contract between Buyer and Seller for the sale of products described in the Bid Quote (the "Contract").

ACCEPTANCE: Submission of this Contract to Buyer constitutes Seller's offer to the Buyer and on acceptance becomes a binding contract on the terms set forth herein. Buyer's acceptance is expressly limited to the terms of this Contract. Seller rejects all terms included in any response by the Buyer to this Contract that are in conflict with, inconsistent with, or in addition to the terms and conditions contained herein. But if a conflict arises between the terms of a purchase order first issued by Buyer and the terms of this Contract, the terms of this Contract shall take precedence.

ENTIRE AGREEMENT: The Contract comprises the entire agreement between the Buyer and the Seller, and supersedes all prior or contemporaneous understandings, agreements, negotiations, representations and warranties, and communications, both written and oral. This Contract prevails over any terms and conditions of purchase provided by Buyer, regardless of whether or when the Buyer has submitted its purchase order or such terms. In addition, implied terms and conditions from the Buyer's contracts with other entities are not valid or enforceable with respect this Contract. Fulfillment of the Buyer's order does not constitute acceptance of any of Buyer's terms and conditions and does not serve to modify or amend this Contract.

GOVERNING LAWS: Seller will comply with all laws applicable to Seller during sale of the products. Buyer will comply with all laws applicable to Buyer during operation or use of the products. The laws of the State of Washington shall govern the validity, interpretation, and enforcement of any order of which these provisions are a part, without giving effect to any rules governing the conflict of laws. Assignment may be made only with written consent of both parties. Buyer shall be liable to the Seller for any attorney's fees and costs incurred by Seller in enforcing any of its rights hereunder. Unless otherwise specified, any reference to Buyer's order is for identification only.

JURISDICTION AND VENUE: Any legal suit, action or proceeding arising out of relating to this Contract shall be commended in federal or state court located King County, Washington and Seller and Buyer (i) irrevocably submit to the exclusive jurisdiction and venue of any such court in any such suit, action or proceeding and (ii) irrevocably waive (to the extent permitted by applicable law) any objection which they now or hereafter may have to the laying of venue of any such action or proceeding brought in any of the foregoing courts in and of the State of Washington, and any objection on the ground that any such action or proceeding in any such court has been brought in an inconvenient forum.

ATTORNEYS FEES AND EXPERT COSTS: The prevailing party in any legal suit, action, or proceeding arising out of relating to the Contract shall be awarded its reasonable attorneys' fees and experts costs.

WARRANTY:
THE SELLER MAKES NO WARRANTIES ON ANY PRODUCTS OR SERVICES PROVIDED UNDER THIS CONTRACT, INCLUDING ANY (A) WARRANTY OF MERCHANTABILITY, (B) WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, OR (C) WARRANTY AGAINST INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS OF A THIRD PARTY, WHETHER EXPRESS OR IMPLIED BY LAW, COURSE OF DEALING, COURSE OF PERFORMANCE, USAGE OF TRADE OR OTHERWISE. BUT THE BUYER SHALL RECEIVE WARRANTIES, IF ANY, PROVIDED BY THE MANUFACTURER OF THE PRODUCTS SOLD UNDER THIS CONTRACT. THE SELLER IS EXPRESSLY EXCLUDED FROM ANY WARRANTY AND ALL CHARGES, FOR LABOR, INSTALLATION, REMOVAL, REPAIR, REINSTALLATION, SHIPPING, UTILITIES, EQUIPMENT RENTAL, OTHER REQUIRED MATERIALS, OR ANY OTHER ITEMS. THE PARTIES AGREE THAT THE BUYER'S SOLE AND EXCLUSIVE REMEDIES SHALL BE AGAINST THE PRODUCT MANUFACTURER AS PROVIDED HEREIN. THE BUYER AGREES THAT NO OTHER REMEDY (INCLUDING, BUT NOT LIMITED TO, INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR LOST PROFITS, LOST SALES, DOWN TIME, OPERATING OR MAINTENANCE COSTS, INJURY TO PERSONS OR PROPERTY, OR ANY OTHER SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL LOSS) SHALL BE AVAILABLE TO BUYER. BUYER SHALL FOLLOW ALL STORAGE, OPERATION, AND MAINTENANCE PROCEDURES SPECIFIED BY THE MANUFACTURER FOR WARRANTY COVERAGE, FAILURE TO FOLLOW THESE PROCEDURES INCLUDING DOCUMENTATION MAY RESULT IN LOSS OF WARRANTY COVERAGE.

TAXES: Seller does not include any Federal, State, City, County, or other sales, custom duties, or taxes such as sales, use, excise, retailer's, occupation or similar taxes and fees, in the Contract Price unless otherwise explicitly stated in writing. Any taxes not included in the Bid Quote will be added to the Contract Price. In lieu of paying such taxes to the Seller, the Buyer may furnish the Seller with a Tax Exemption Certificate or other legal and appropriate taxing authorities at any time.

PAYMENT TERMS: All quotations or proposals are in US Dollars unless explicitly stated otherwise in writing. Seller shall submit invoices for payment to Buyer for percentages of the Contract Price as described in Bid Quote. Buyer must pay all invoices submitted by Seller no later than 30 days after the date of the invoice. the shipment is delayed by the Buyer, date of readiness for shipment shall be deemed the date of shipment for payment purposes. The Seller may require advance payment or a certificate of deposit, or may otherwise modify credit terms, should the Buyer's credit standing not meet the Seller's requirements. A service charge of 2.5% per month on the unpaid balance will be charged on all overdue monies payable. Buyer shall not assign or transfer their contract or any interest in it, or monies payable under it, without the written consent of Seller and any assignment made without such consent shall be null and void. Buyer agrees to pay all collection costs and costs of suit, including reasonable attorney fees, in the event Seller institutes collection action for overdue account. Seller expressly reserves all available lien rights in connection with any transaction between the parties. Unless explicitly agreed upon in writing, retainage against the contract amount is not allowed. The Seller reserves the right to re-possess all equipment that is not paid for in full per this Contract's payment terms.

CREDIT CARD PAYMENTS: All credit card payments will require an additional 2% surcharge in addition to the Contract Price listed in the Contract. All credit card payments over $5000.00 require written pre-approval by the Seller prior to processing; approval is not guaranteed.

CREDIT: Buyer is required to provide all necessary credit information to Seller with each order, including bank reference, bonding company, or other necessary information with complete names, addresses, phone numbers, personal references, and account and bond numbers. The Seller will determine, in its sole discretion, what is acceptable and what credit rating is required for the Seller to allow a purchase on credit.

PRICE: The prices specified are in U.S. currency, payable free of all expense to the Seller for collection charges.

STARTUP PAYMENTS: If startup services are included in this Contract, the pre-agreed upon payment amount shall be due when startup is complete. If startup is delayed more than 90 days after equipment delivery, payment for startup shall be due 90 days after equipment delivery prior to the startup occurring. Delaying in paying this portion of the contract is subject to the PAYMENT TERMS above.

SHIPMENTS AND DELIVERY: Delivery and shipping times are Seller's best estimate and do not include product approval time or order processing time. Seller is not liable for any damages, fees, costs, expenses or penalties arising from (1) loss of or damage to product in transit or (2) delays in shipping or delivery of the product, including all delays caused by an accident; riots; insurrections; national emergency; labor disputes of every kind however caused; embargoes; non-delivery by suppliers; delays of carriers or postal authorities; or governmental restrictions, prohibitions, or requirements. Seller may, in its sole discretion, without liability or penalty, make partial shipments of products to Buyer. Each shipment will constitute

a separate sale, and Buyer shall pay for the units shipped whether such shipment is in whole or partial fulfillment of Buyer's order. Cost of handling and freight is only included when it is explicitly listed in this Contract.

NON-DELIVERY: The quantity of any installment of products as recorded by Seller on dispatch from Seller's place of business is conclusive evidence of the quantity received by Buyer on delivery unless Buyer can provide conclusive evidence proving the contrary. Any liability of Seller for non-delivery of the products shall be limited to replacing the products within a reasonable time or adjusting the invoice respecting such products to reflect the actual quantity delivered.

APPROVALS: Buyer is responsible for obtaining approval on products from project owners and engineers. The Seller represents only those products are as described in this Contract. The Seller does not warrant that the products described will be approved or otherwise satisfactory to project owners or engineers, or that products meet project specifications. Seller does not guarantee compliance with any codes or laws unless explicitly stated in this Contract. Performance of the overall system that incorporates the products is not guaranteed.

OCCUPATIONAL SAFETY AND HEALTH ACT of 1970 – Seller does not warrant or represent that any of Seller's products by themselves or in a system or with other equipment will conform to or comply with the provisions of the Occupational Safety and Health Act of 1970 and the standards and regulations issued thereunder, or any other federal, state, or local law or regulation of the same or similar nature.

LIMITATION OF LIABILITY - NEITHER SELLER, NOR ITS SUPPLIERS SHALL BE LIABLE, WHETHER IN CONTRACT, WARRANTY, FAILURE OF A REMEDY TO ACHIEVE ITS INTENDED OR ESSENTIAL PURPOSES, TORT (INCLUDING NEGLIGENCE), STRICT LIABILITY, INDEMNITY OR ANY OTHER LEGAL THEORY, FOR LOSS OF USE, REVENUE OR PROFIT, OR FOR COSTS OF CAPITAL OR OF SUBSTITUTE USE OR PERFORMANCE, OR FOR INDIRECT, SPECIAL, LIQUIDATED, INCIDENTAL OR CONSEQUENTIAL DAMAGES, OR FOR ANY OTHER LOSS OR COST OF A SIMILAR TYPE, OR FOR CLAIMS BY BUYER FOR DAMAGES OF BUYER'S CUSTOMERS. SELLER'S AGGREGATE LIABILITY ARISING OUT OF OR RELATING TO THIS CONTRACT SHALL NOT EXCEED THE CONTRACT PRICE, PROVIDED HOWEVER, IF THE BID QUOTE INCLUDES FIELD OR STARTUP SERVICE, SELLER'S LIABILITY FOR SAID SERVICES SHALL BE LIMITED TO THE VALUE OF THE SERVICES. BUYER AND SELLER AGREE THAT THE EXCLUSIONS AND LIMITATIONS SET FORTH IN THIS ARTICLE ARE SEPARATE AND INDEPENDENT FROM ANY REMEDIES WHICH BUYER MAY HAVE HEREUNDER AND SHALL BE GIVEN FULL FORCE AND EFFECT REGARDLESS OF WHETHER ANY OR ALL SUCH REMEDIES SHALL BE DEEMED TO HAVE FAILED OF THEIR ESSENTIAL PURPOSE.

STORAGE – If for any reason Buyer fails to accept products that have been delivered by Seller, or if Seller is unable to deliver the products because Buyer has not provided appropriate instructions, documents, licenses, or authorizations, then Seller may place the products in storage at Buyer's cost and expense, which includes the cost of storage, shipping fees, insurance, and other incidental expenses. The Buyer carries risk of loss for products in storage.

TITLE - Title to the products and risk of loss or damage passes to Buyer upon delivery of the products at the Point of Delivery listed in the Bid Quote. As collateral security for the payment of the Contract Price for the products, Buyer hereby grants to Seller a lien on and security interest in and to all of the right, title and interest of Buyer in, to, and under the products, wherever located, and whether now existing or hereafter arising or acquired from time to time, and in all accessions thereto and replacements or modifications thereof, as well as all proceeds (including insurance proceeds) of the foregoing. The security interest granted under this provision constitutes a purchase money security interest under the Washington Uniform Commercial Code. Buyer agrees to perform all additional acts necessary to perfect and maintain said security interest.

INSURANCE: Buyer shall, at its own expense, purchase, maintain and carry adequate insurance for the products to protect against loss or damage from any external cause, including losses from fire, wind, water, or other causes. Insurance coverage must be maintained with insurance companies legally authorized to do business where said products are located in an amount at least equal to the value of said products until the products are accepted and paid for in full. Upon Seller's request, Buyer shall provide Seller with a certificate of insurance from Buyer's insurer evidencing the insurance coverage that is satisfactory to Seller. The certificate of insurance must name Seller as an additional insured. In no case does the Contract Price, even if inclusive of freight, cover the cost of insurance beyond the Point of Delivery specified in the Bid Quote]

CANCELLATION: The Buyer may cancel its order only upon written notice, and in turn will make payment to Seller of reasonable cancellation charges specified by Seller.

ORAL STATEMENTS: The Seller's personnel may have made oral statements about the products described in this Contract during the sales process. Such statements do not constitute warranties or guarantees and shall not be relied on by the Buyer. The entire contract is embodied in this writing. This writing constitutes the final expression of the parties' agreement, and it is a complete and exclusive statement of the terms of that agreement.

CHANGES: Seller reserve the right to make changes and to substitute other material as needed to make shipments and fulfill orders under this Contract.

ERRORS: Seller reserves the right to correct clerical or stenographic errors or omissions.

STATUTE OF LIMITATIONS - To the extent permitted by applicable law, any lawsuit for breach of contract, including breach of warranty, arising out of the transactions covered by this order, must be commenced by the Buyer not later than twelve (12) months from the delivery of Seller's Products or the last day Seller performed any services, whichever is earlier.

INSPECTION: Buyer shall inspect Seller's Products upon receipt, and if Buyer's inspection reveals any defects in the Products, Buyer shall notify the Seller within three (3) days after receipt of the Products of any claim Buyer might have concerning such defects in the Products discovered by Buyer. Buyer's failure to notify Seller within such a three (3) day period shall constitute a waiver by Buyer of all claims covering such defects in the Products. It is the Buyer's responsibility to inspect for shipping damage upon delivery and to initiate a damage claim with the freight carrier. Damage occurring in-transit by the freight carrier must be claimed by the Buyer and is not the Seller's responsibility.

NOT INCLUDED: Seller does not include any item not specifically listed as included. References to specifications and drawings in the Scope of Supply section of the Bid Quote does not indicate that all items in those documents are included in the Scope of Supply. Unless clearly included in this Contract, engineering and design services are not included in this Contract.

FREIGHT: Prices quoted are F.O.B. point of manufacture and do not include freight unless specifically listed as included. Title passed to the Buyer at the Point of Delivery listed in the Bid Quote and all freight claims are the responsibility of the Buyer.

BACKCHARGES will not be accepted unless approved by Seller, in writing, before any work is done.

DELAYS: Price and terms and conditions are subject to revision if manufacture is not released at time of order placement or drawings for approval are not returned within 30 days from receipt by customer, or manufacture is released and subsequently held or delayed by the customer for more than 30 days, or customer requests longer than quoted shipment. If Seller suffers delay in performance due to any cause beyond its control, including but not limited to act of God, war, pandemic, act or failure to act of government, act or omission of Buyer, fire, flood, strike or labor troubles, sabotage, or delay in obtaining from others suitable services, materials, components, equipment or transportation, the time of performance shall be extended a period of time equal to the period of the delay and its consequences. Seller will give Buyer notice in writing within a reasonable time after the Seller becomes aware of any such delay.

DECOMPOSITION AND WEAR: Decomposition by chemical action and wear caused by the presence of abrasive materials shall not constitute defects.

BUYER DATA - Timely performance is contingent upon the Buyer supplying to the Seller, when needed, all required technical information, including drawing and submittal approval, and all required commercial documentation. The Buyer shall also supply and complete all shipping delivery information, pre-delivery checklists, and pre-startup checklists in a timely manner or the overall schedule of the project may be impacted at no cost to the Seller regardless of any potential agreed upon damages.

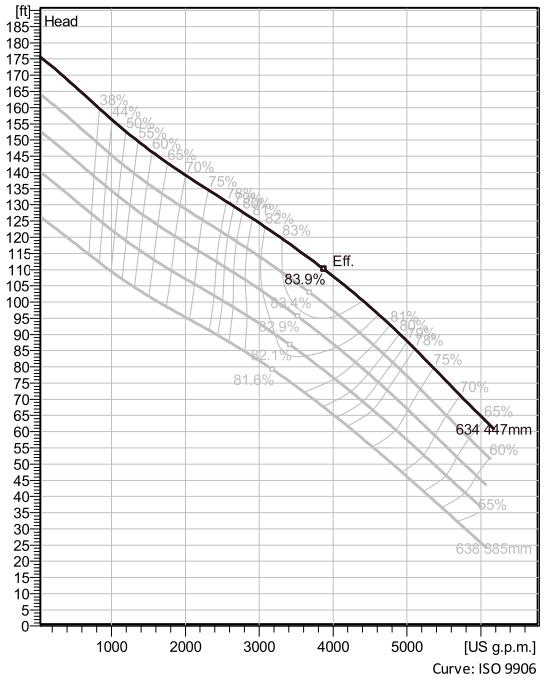
BUYER SUPPLIED COMPONENTS - Buyer acknowledges that the products purchased by Buyer under this Contract may contain products supplied by the Buyer or supplied by a third party at the Buyer's direction ("Buyer Supplied Components"). Buyer Supplied Components are not covered by any warranty or guarantee in this Contract. For the avoidance of doubt, Seller makes no representations or warranties with respect to any Buyer Supplied Components. Seller disclaims any liability arising from Buyer Supplied Components delivered late, damaged, defective, or nonconforming. In no event shall Seller be liable for consequential, indirect, incidental, special, exemplary, punitive damages, or lost profits, arising out of or relating to late delivery of or defective Buyer Supplied Components. Subject to the terms and conditions of this Contract, Buyer shall indemnify, defend and hold harmless Seller and its representatives/officers, directors, employees, agents, affiliates, successors and permitted assigns ("Indemnified Party") against any and all losses, damages, liabilities, deficiencies, claims, actions, judgments, settlements, interest, awards, penalties, fines, costs, or expenses of whatever kind, including attorney and expert fees, fees and costs of enforcing any right to indemnification under this Contract, and the cost of pursuing any insurance providers, incurred by Indemnified Party in a final judgment relating to any third-party claims arising from defective Buyer Supplied Components.

NP 3315 MT 3~ 634

Patented self cleaning semi-open channel impeller, ideal for pumping in waste water applications. Modular based design with high adaptation grade.

Technical specification

Curves according to: Water, pure Water, pure [100%], 39.2 °F, 62.42 lb/ft³, 1.6891E-5 ft²/s



Curve: ISO 9906

Configuration

Motor number
N3315.095 35-45-6AA-W 140hp

Installation type
P - Semi permanent, Wet

Impeller diameter
447 mm

Discharge diameter
10 inch

Pump information

Impeller diameter
447 mm

Discharge diameter
10 inch

Inlet diameter
250 mm

Maximum operating speed
1185 rpm

Number of blades
3

Max. fluid temperature
40 °C

Materials

Impeller
Hard-Iron ™

Project	**Created by**	Christy Zellmer	
Block	**Created on**	8/17/2022 **Last update**	8/17/2022

NP 3315 MT 3~ 634

Technical specification

Motor - General

Motor number N3315.095 35-45-6AA-W 140hp	**Phases** 3~	**Rated speed** 1185 rpm	**Rated power** 140 hp
ATEX approved FM	**Number of poles** 6	**Rated current** 177 A	**Stator variant** 1
Frequency 60 Hz	**Rated voltage** 460 V	**Insulation class** H	**Type of Duty** S1
Version code 095			

Motor - Technical

Power factor - 1/1 Load 0.80	**Motor efficiency - 1/1 Load** 93.0 %	**Total moment of inertia** 47.9 lb ft²	**Starts per hour max.** 15
Power factor - 3/4 Load 0.74	**Motor efficiency - 3/4 Load** 93.4 %	**Starting current, direct starting** 1200 A	
Power factor - 1/2 Load 0.63	**Motor efficiency - 1/2 Load** 92.9 %	**Starting current, star-delta** 400 A	

Project	**Created by**	Christy Zellmer		
Block	**Created on**	8/17/2022	**Last update**	8/17/2022

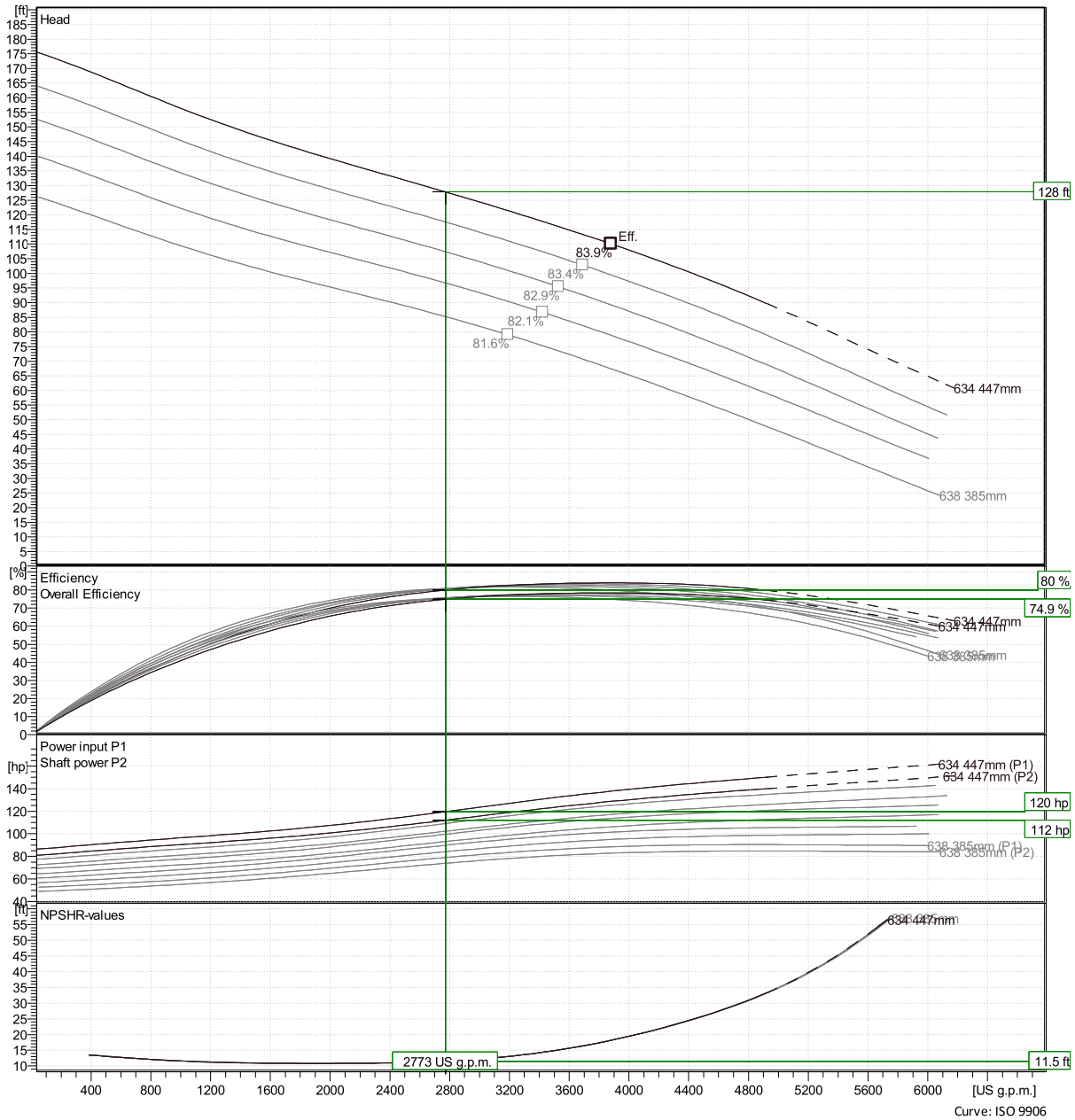
NP 3315 MT 3~ 634

Performance curve

Duty point

Flow	Head
2770 US g.p.m.	128 ft

Curves according to: Water, pure Water, pure [100%],39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s



Curve: ISO 9906

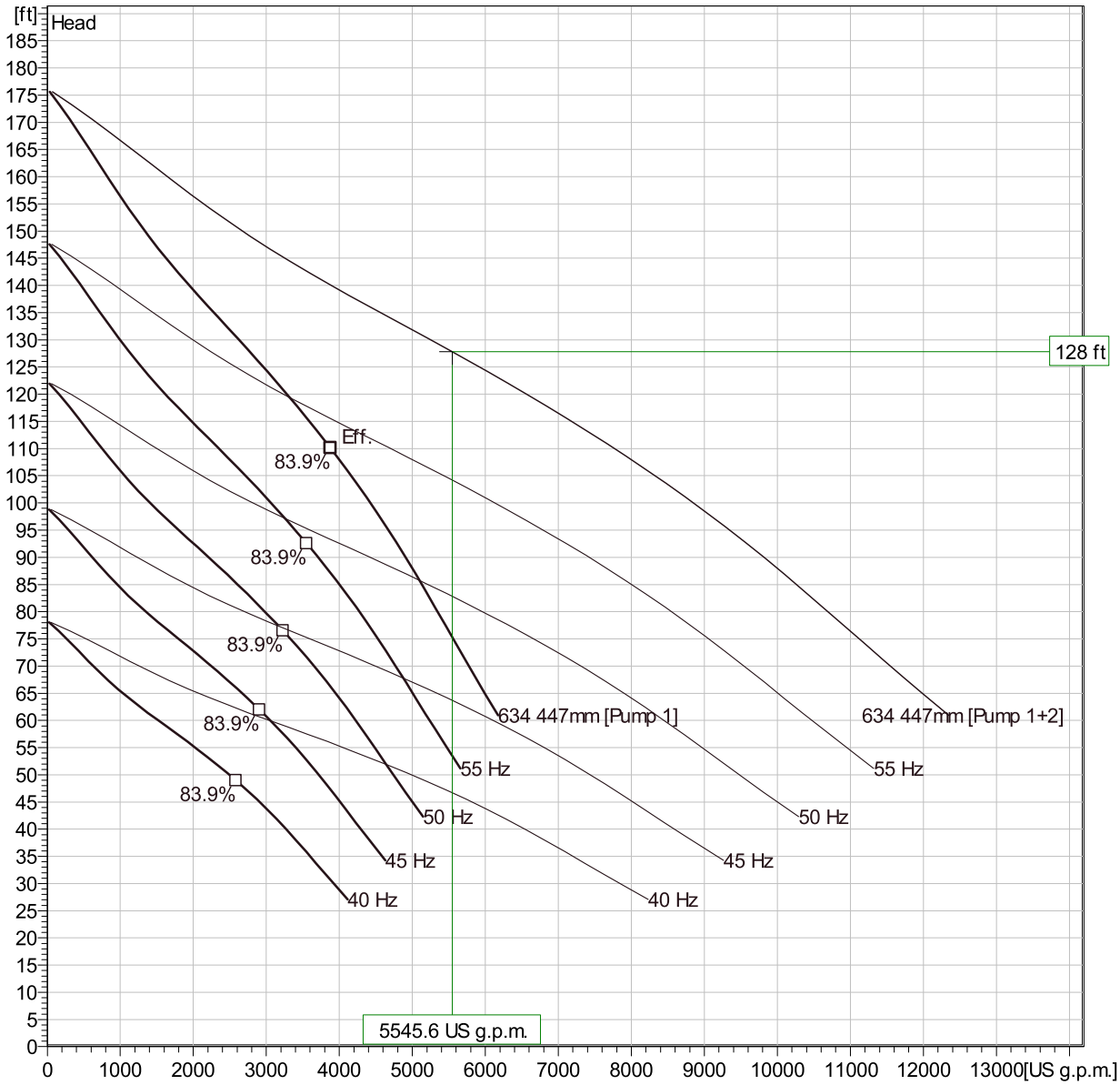
Christy Zellmer

Created on 8/17/2022 **Last update** 8/17/2022

NP 3315 MT 3~ 634

Duty Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Operating characteristics

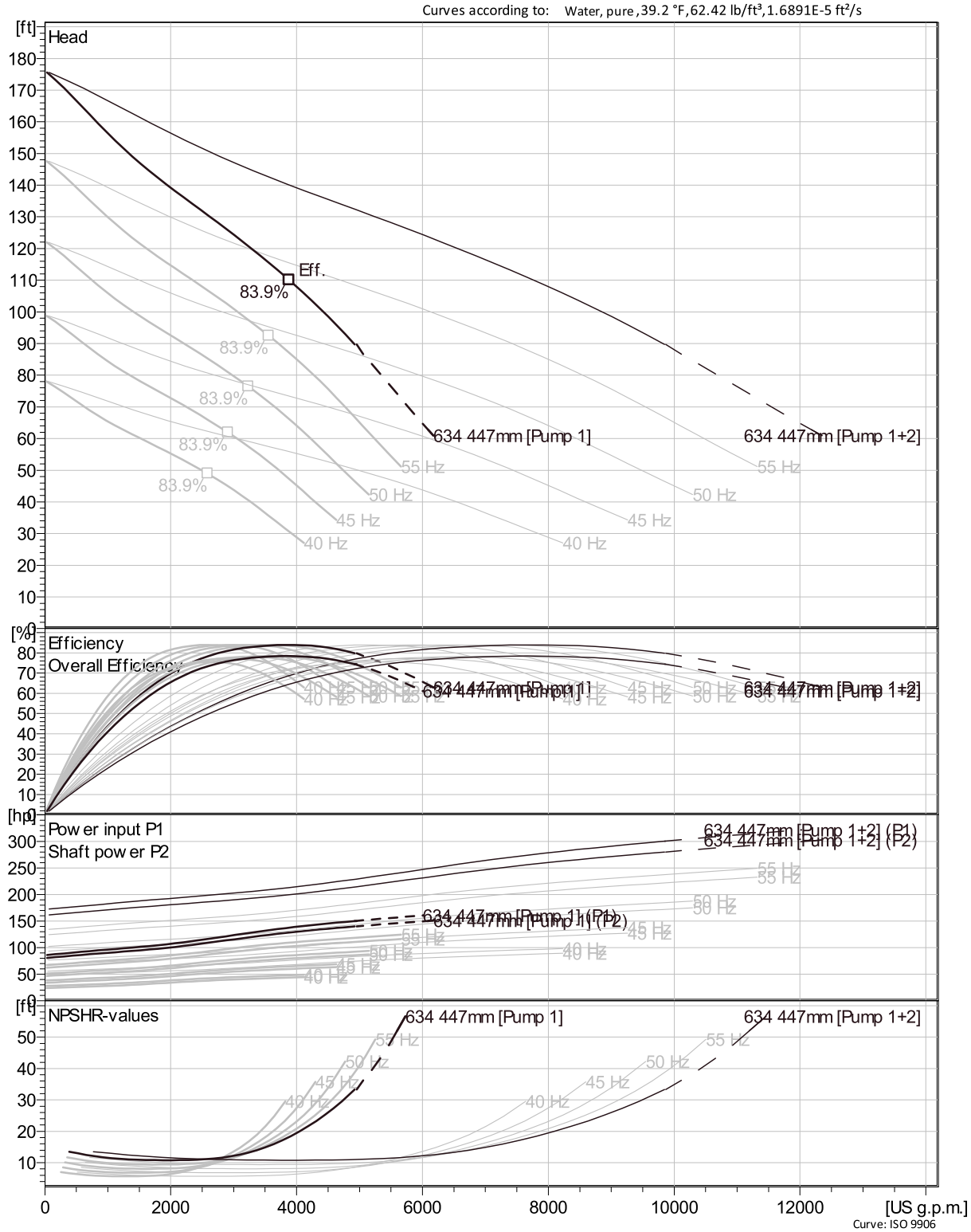
Pumps / Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Spec. Energy	NPSHre
	US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
2 / 1	2770	128	112	5550	128	224	80 %	537	11.5
1 / 1	3660	114	126	3660	114	126	83.8 %	457	16.1

Project		**Created by**	Christy Zellmer		
Block		**Created on**	8/17/2022	**Last update**	8/17/2022

NP 3315 MT 3~ 634

VFD Curve

Curves according to: Water, pure ,39.2 °F,62.42 lb/ft³,1.6891E-5 ft²/s

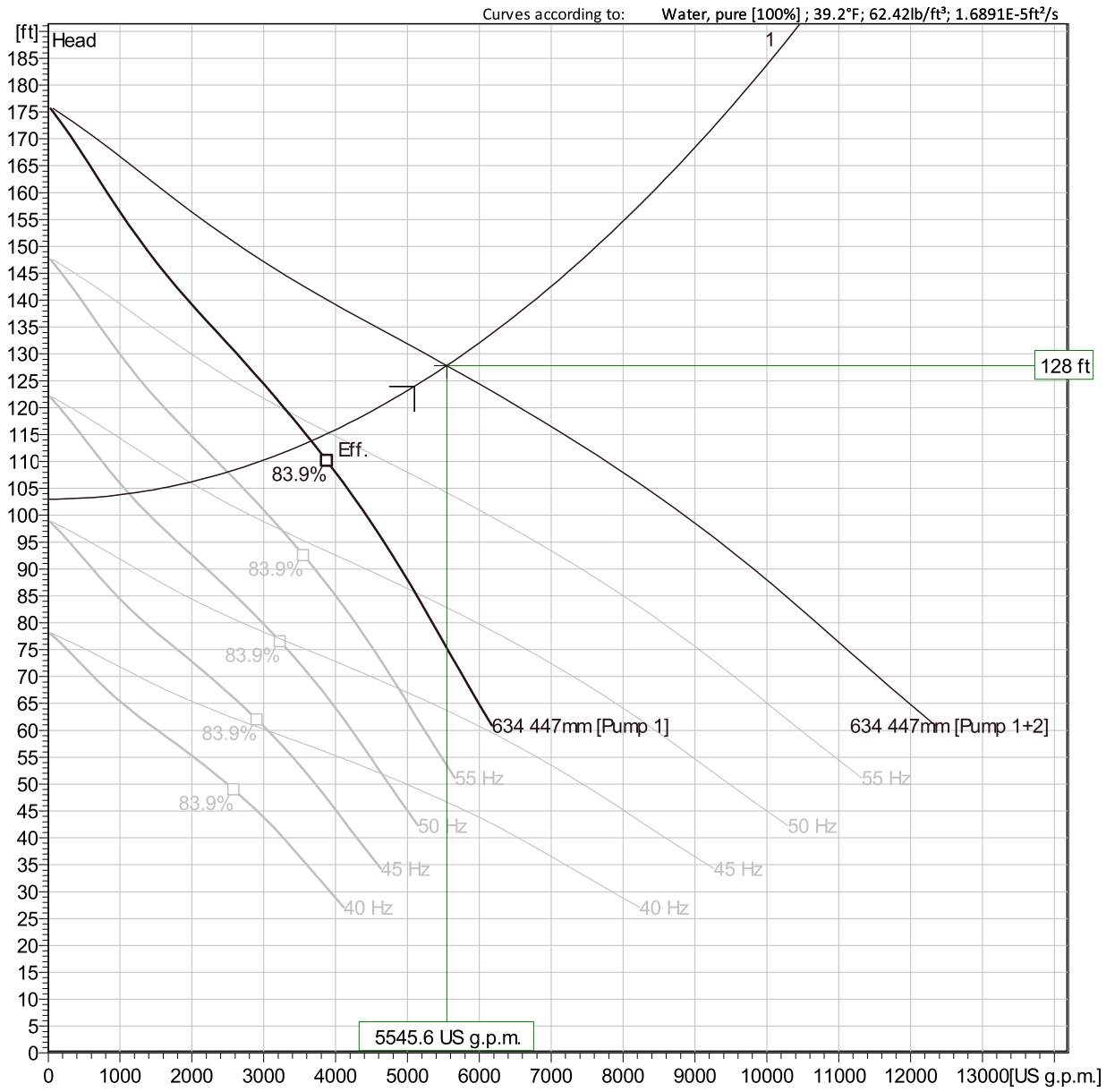


Curve: ISO 9906

Project		**Created by**	Christy Zellmer		
Block		**Created on**	8/17/2022	**Last update**	8/17/2022

NP 3315 MT 3~ 634

VFD Analysis



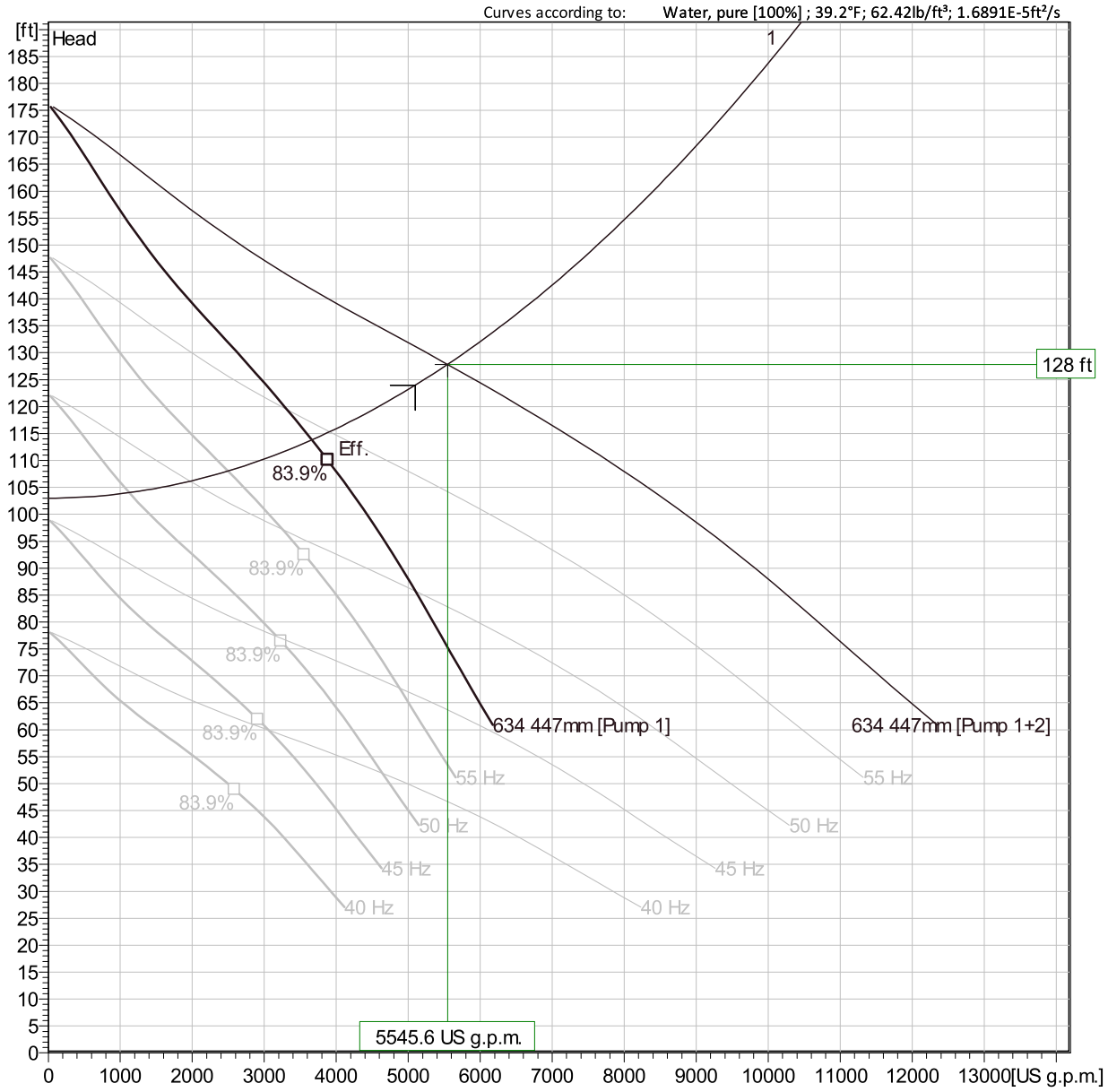
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
2 / 1	60 Hz	2770	128	112	5550	128	224	80 %	537	11.5
2 / 1	55 Hz	1950	115	78.9	3910	115	158	72.2 %	539	9.42
2 / 1	50 Hz	986	106	53.3	1970	106	107	49.7 %	731	8.4
2 / 1	45 Hz									

Project		**Created by**	Christy Zellmer		
Block		**Created on**	8/17/2022	**Last update**	8/17/2022

NP 3315 MT 3~ 634

VFD Analysis



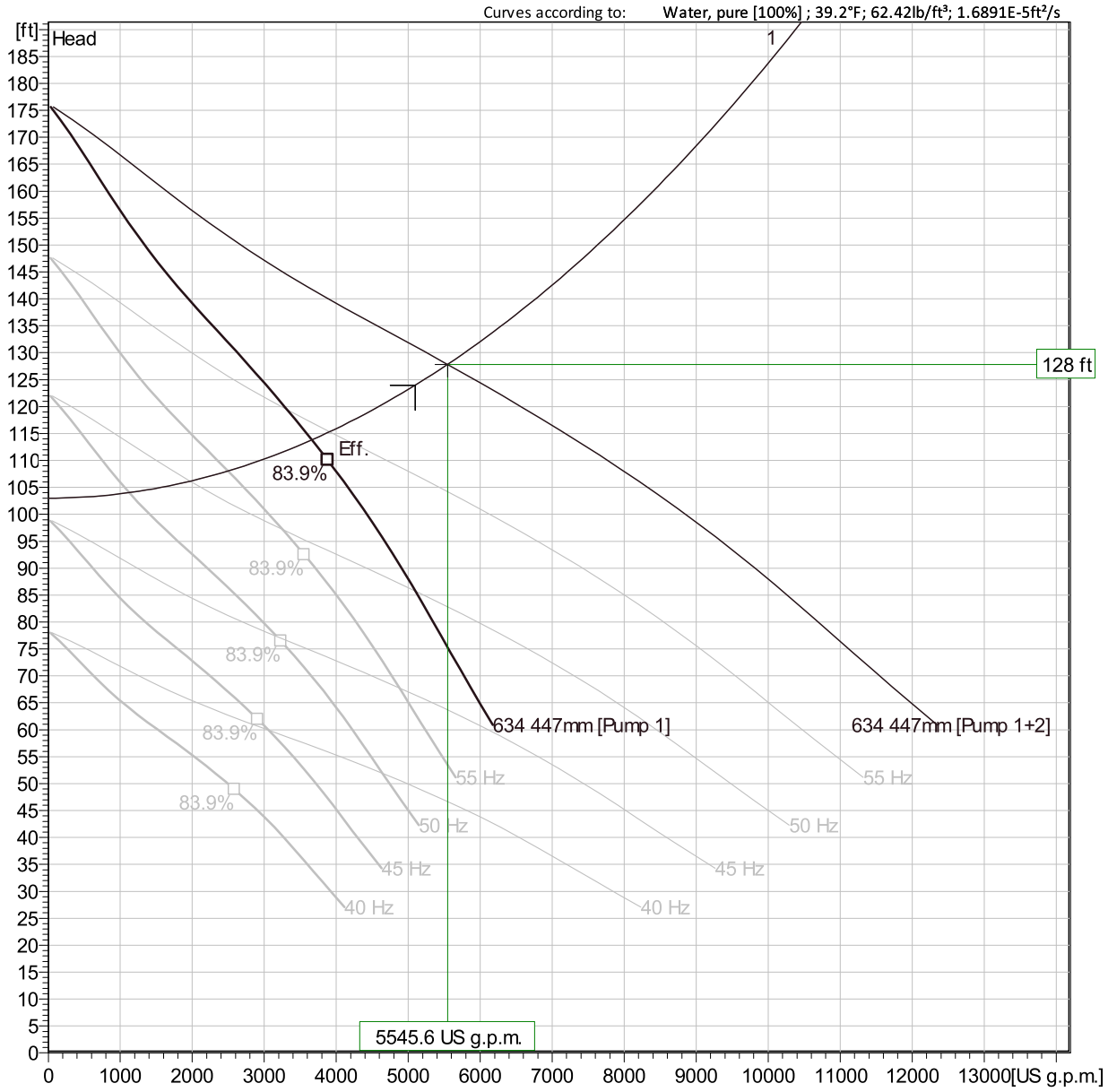
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
2 / 1	40 Hz									
1 / 1	60 Hz	3660	114	126	3660	114	126	83.8 %	457	16.1
1 / 1	55 Hz	2500	108	85.7	2500	108	85.7	79.6 %	458	9.94
1 / 1	50 Hz	1120	104	54.2	1120	104	54.2	54.6 %	651	8.25

Project		**Created by**	Christy Zellmer		
Block		**Created on**	8/17/2022	**Last update**	8/17/2022

NP 3315 MT 3~ 634

VFD Analysis



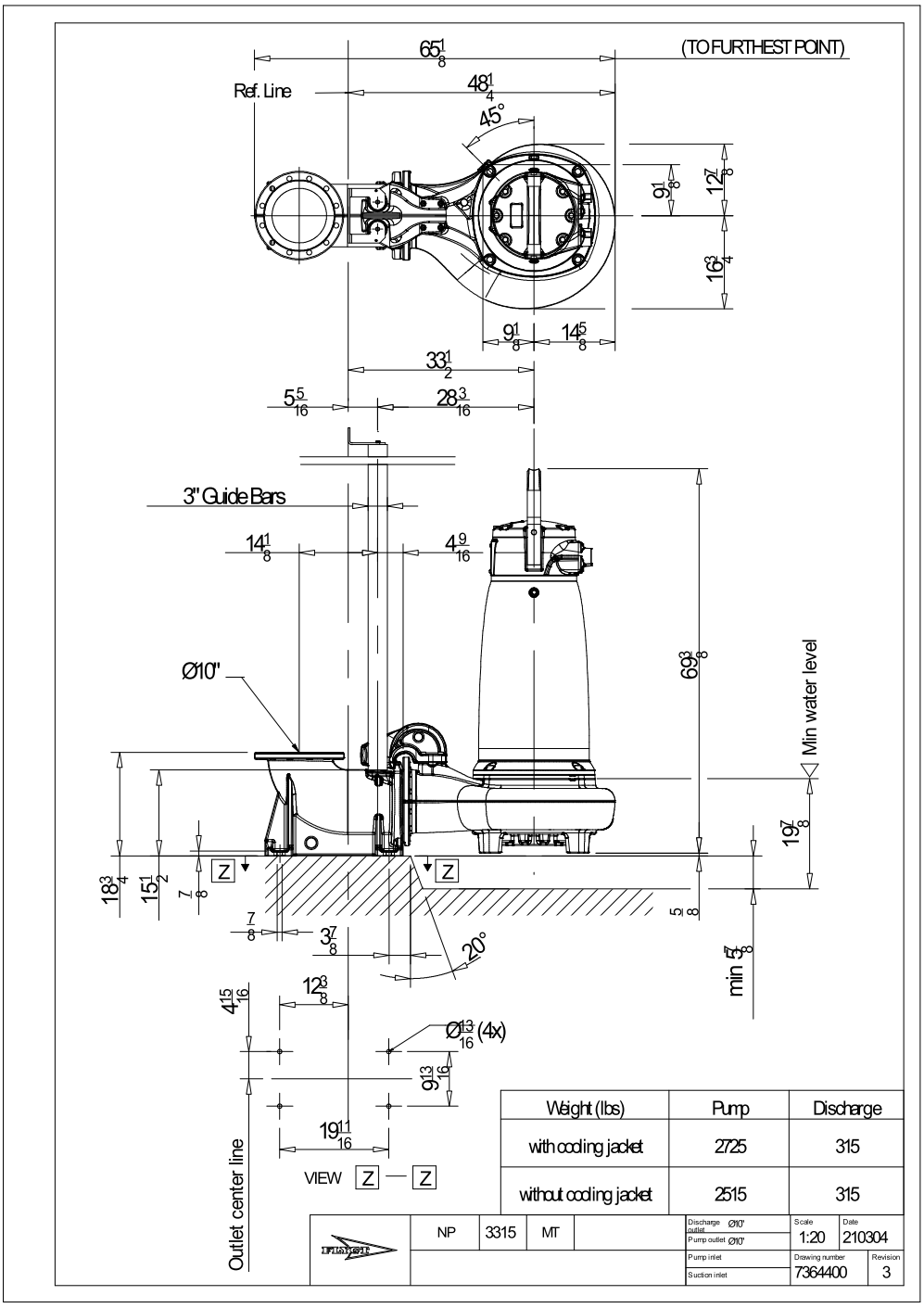
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	ft
1 / 1	45 Hz									
1 / 1	40 Hz									

Project		**Created by**	Christy Zellmer		
Block		**Created on**	8/17/2022	**Last update**	8/17/2022

NP 3315 MT 3~ 634

Dimensional drawing



Project	**Created by**	Christy Zellmer	
Block	**Created on**	8/17/2022	**Last update** 8/17/2022

APPENDIX F

CONTRACTING AGENCY-FURNISHED PERMITS

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Site Development Activity Permit (SDAP)

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Kitsap County Department of Community Development

July 22, 2022

Barbara Zaroff
Kitsap County Public Works
614 Division ST, MS 26
Port Orchard, WA 98366
BZaroff@kitsap.gov

RE: Sewer Utility Pump Station #4
Site Development Activity Permit (SDAP) #22-00369
PLAN ACCEPTANCE

We have reviewed and accept for construction the civil site plans for the above referenced project. This permit must be issued within **365** days from the date of approval letter, per Kitsap County Code 12.10.055. Per the Department of Community Development/Public Works (DCD/PW) SDAP Procedure, the following documents must be uploaded to SMARTGov prior to issuing the permit placard:

1. Final Approved Plan Set
2. Final Approved Drainage Report, if revised after 90% design stage
3. Construction Stormwater Pollution Prevention Plan (SWPPP)
4. Certificate of Liability Insurance

After construction is complete the following must be uploaded to SMARTGov in order for DCD to complete the permit close-out:

1. Inspection Dates
2. Project As-builts

Please be aware of the following requirements by other agencies associated with the proposed construction:

1. The demolition of the existing control building and subsequent construction of the replacement building will require a Commercial building permit with DCD.
2. This project includes the construction of rock walls or other retaining facilities that either exceed four feet in height or sustain a surcharge. A separate building permit with an engineered design is required for such walls.

If we can be of further assistance, please contact **Cecilia Olsen** at colsen@kitsap.gov.

This letter follows the SDAP procedure established between the two departments; please refer to the Site Development Activity Permit for Capital Projects Process Procedure document for more information on the process.

Sewer Utility Pump Station #4
SDAP #22-00369

Sincerely,

Cecilia Olsen

Cecilia Olsen, Project Lead — 7/22/2022 Date

Samantha Long, Development Engineering Supervisor — 7/22/2022 Date

Building Permit (County)

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DOE Construction Stormwater General Permit

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APPENDIX G

ADDENDA

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APPENDIX H

Diesel Generator Submittal Data

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CUMMINS INC
1030 SW 34th St. Suite A
Renton, WA 98057-2944 United States
(425)277-5346
November 16, 2022

Submittal for:
Kitsap PS 4

Cummins Inc. Project No. TBD
PO No.: 2022-14463

Customer Requested Delivery Date: October 20, 2023
Customer Requested Equipment Delivery Address:
12351 Brownsville Hwy NE, Poulsbo, WA 98370
Contact Person & Phone # for Deliveries: Nick Martin, KCSU 360-271-1427

Equipment will be shipped direct to this address in a enclosed truck for items to be unloaded by Customer.

Transfer switch(es) require a withstand and closing rating (WCR) capable of meeting the available upstream fault current (kAIC). The WCR may be based on a specific breaker rating or a time-based rating, and it is the responsibility of the facility designer or engineer to verify compatibility. A full listing of the WCR is included as a part of this submittal.

Prepared for:
Nick Martin
~~**BHC Consultants, LLC**~~
~~**Seattle WA, 98101**~~
Kitsap County Public Works
Sewer Utility
Port Orchard WA, 98366
Phone No.: 360-271-1427
Email: nmartin@kitsap.gov

Customer Approval

□ Revise and Resubmit

□ Approved as Noted/Release for Production

X Released for Production Floyd Bayless Digitally signed by Floyd Bayless Date: 2022.12.01 14:50:59 -08'00'

By: Floyd Bayless, KCSU CM Dated: December 01, 2022

Important:
1. By signing this submittal you're approving it as submitted unless noted.
2. Any change to the scope of supply may impact the current shipping schedule and the contract price, as such, Cummins Inc. can NOT accept any changes to the scope of supply within 60 Calendar days before shipment.
3. **Our Company policy states that "We can NOT order any materials or proceed with production without an approved and release submittal that includes a required ship date".**

Prepared by: Nick Sewell
Mobile Number: 425-984-3531
Email Address: nicholaus.sewell@cummins.com

November 16, 2022
Project Name: **Kitsap PS 4**
Project Number: **TBD**

Dear Nick Martin,

Thank you for your order. The next step in the process is the submittals phase.
Attached please find the submittal, prepared by Nick Sewell the Project Engineer assigned to your Project.
Please review the submittal and return it to him as soon as possible along with your approval and/or changes clearly indicated so we can continue to process your order.

Our company policy states we cannot order any materials or proceed with any production without an approved Submittal returned from you along with requested delivery date, and delivery location.

Current lead time is approximately **46-48 Weeks** Split shipments and drop shipments on equipment that do not need local upfit are possible, but requirements must be advised at the time of release.

Note: Requested delivery date is not a guarantee of delivery date. Leadtimes at time of release can vary due to market conditions and manufacturing production capacities. We will advise you of our closest delivery target to match your request within 1-2 weeks.

A Cummins Project Team has now been assigned to your project. Their names and contacts are listed below. For all technical issues, your Project Engineer, Nick Sewell, will best be able to assist you at this stage of the project Feel free to contact anyone on your Project Team directly.

Name	Title	Function	Phone	Email
Zach Schulte	Territory Manager	Sales	206-794-9801	zach.t.schulte@cummins.com
Nick Sewell	Project Manager Seattle	Prepares Submittals, Handles All Technical Issues	425-984-3531	nicholaus.sewell@cummins.com
Doug Grenfell	Start and Test Manager North	Schedules Pre-Inspect and S&T	-	doug.grenfell@cummins.com
Jenness Mann	Project Coordinator	Project Coordinator Portland	503-289-0900 x1136	jenness.mann@cummins.com

Best regards,

Nick Sewell

Nick Sewell
Cummins Inc.

Power Generation

November 16, 2022

Notice to End User or Contractor

***

Please make sure you've reviewed our Automatic Transfer Switch Withstand and Closing Rating Chart for compliance with our list of acceptable breakers being used upstream of the ATS.

***

This order is provided with one set of owners and installation manual meant for the installing contractor. Additional copies may require a change order while electronic copies can be provided free of charge.

***

Approval Drawings

This Approval Drawing Package is submitted as our interpretation of the contract drawings and/or the specifications for this job.

It is the obligation of the electrical contractor and reviewing engineer to determine that the item quantities and accuracy of this submittal is correct as required for the job. Any inccuracies or deviations must be addressed with Cummins Inc. before release to manufacturing. Any releases of material to manufacturing by the above parties constitute an acceptance of the accuracy of the submittal. Any changes after release will be viewed as a change order, subject to pricing changes.

Please take the time to review this package for accuracy to prevent any after-shipment problems. This will allow the job to be shipped correctly and prevent any delay in energization.

***

Power Generation

November 16, 2022
Project Name: **Kitsap PS 4**
Project Number: **TBD**
PO Number: **2022-14463**

Summary Sheet

This table is provided for reference only, not for construction. Please refer to specific materials within submittal or call Cummins Inc. to double check values.

Project Manager: Nick Sewell Phone Number: 425-984-3531 Email: nicholaus.sewell@cummins.com

Major Equipment Shipping Weights and Dimensions

Equipment	Length (in)	Width (in)	Height (in)	Weight (lbs)	Color	Drawing Number
Genset	152	60	71	10,005	Green	A063J084
Housing	222	82	92	9,165	Sandstone	A034J593
Fuel Tank (Dry)	234	86	36	4,780	Black	A034J593
Diesel Fuel Gallonage		Gallons		1700		
Total Genset Package	234	86	128	25,650		

Generator Set - Lug Information

Max. Breaker Amps	Wire (Copper)	
	Quantity	Size
N/A		
N/A		

Automatic Transfer Switch - Lug Information

Amperage	Cable/Phase	Cable Size
N/A		

AC Power Supplies needed for Genset Accessories

Accessories	No. Phases	Voltage	Wattage
Coolant Heater*	1	208/240/480	See Page 56
Battery Charger (Cummins)	1	120/208 - 240	1200

*For genset 250kW and below refer to drawing 0333-0588 for reconnectable heater.

General Wiring Guidelines

Interconnection Wiring To Be # 14 AWG Stranded Wire Minimum. Ac and Dc Control Wires to Be Run In Separate Conduits
Battery Charger to Battery to Be Sized For Charger Output And length of run.
For AC Connections Use # 14 AWG or larger for lengths up to 40 Feet.
Use # 12 AWG or larger for lengths up to 50 Feet.
Use # 10 AWG or larger for lengths up to 100 Feet.
For DC Connections Use # 14 AWG or larger for lengths up to 100 Feet.
Paralleling load share cable to be 18 AWG 4 - conductor twisted shielded cable.
Modbus and PCCnet cable to be Belden model 9729 twisted shielded pair.
Echelon Lontalk network cable to be stranded CAT5.
We recommend running additional 20% spare wires for each circuit.
****REFER TO WIRING DIAGRAMS SUPPLIED WITH SUBMITTAL FOR SPECIFIC INFORMATION****

Table of Contents

Project Number: TBD

CUMMINS STANDARD EXCLUSIONS

Exhaust System

All off-engine piping, hangers, flanges, gaskets, bolts, insulation, other materials and labor to install.

Fuel System

All fuel piping and materials not limited to; supply, return, venting, valves, coolers, filters, pumps, fittings, primary fuel regulator, storage tank & senders, external to genset package. All fuel for testing and initial fill. Fuel tank vent extensions and flame arrestors unless specifically listed in the Bill of Materials.

Cooling System

Intake louvers, exhaust louvers, air dampers, sheet metal ducting, flex adapters, sound attenuators/baffles. All off engine piping, flexible connections, labor and coolant for remote cooling systems.

Electrical

All off-engine wiring, field terminations of wiring, and lugs other than those detailed in our submittal.

Mounting

Mounting bolts and anchors. Vibration isolators (if included) may be shipped loose for installation at the jobsite by others. Seismic engineering calculations.

Electrical Testing

Not limited to InterNational Electrical Testing Association (NETA), infrared scanning, harmonic content or other independent agency testing of switchgear, switchboards, protective relays, circuit breaker, electrical coordination studies, arc flash studies and reactive load site testing.

Environmental Testing

Environmental Protection Agency (EPA), local air quality district or other Authority Having Jurisdiction (AHJ), including acoustical.

Programming

All protective relay settings, breaker settings, PLC programming or other user configurable device programming.

Documentation

Electronic submittals and operation and maintenance manuals will be provided. Printed copies are available upon request, additional charges may apply.

Miscellaneous

Site specific labeling. Exhaust backpressure, airflow restriction or vibration analysis

Design

Cummins is not responsible for system design or engineering and does not guarantee system performance standards. Cummins will supply documentation and reasonable assistance to others responsible for system engineering, design and performance.

Taxes and Permit

Any applicable sales tax, permits, fees, licenses.

Bonds

Any bid bond, payment or performance bond or other type of bond.

All items listed above are excluded and will only be supplied by Cummins if agreed upon, in writing, by a sales representative for Cummins.

November 10, 2022

Bill of Material

Feature Code	Description	Qty
DFEK	DFEK Commercial Diesel Generator Set, 500kW Standby 60Hz	1
Install-US-Stat	U.S. EPA, Stationary Emergency Application	
500DFEK	500DFEK, Diesel Genset, 60Hz, 500kW-Standby Rating	
A331-2	Duty Rating - Standby Power (ESP)	
L170-2	Emission Certification, EPA, Tier 2, NSPS CI Stationary Emergency	
L090-2	Listing - UL 2200	
L228-2	Cert - Seismic, IBC2000, IBC2003, IBC2006, IBC2009, IBC2011	
0170	None-Vibration Isolators-Normal Duty	
R002-2	Voltage - 277/480, 3 Phase, Wye, 4 Wire	
B262-2	Alternator - 60Hz, 12 Lead, Extended Range, 105C	
F205-2	Aluminum Sound Attenuated Level 2 Enclosure, with Exhaust System	
P178-2	Enclosure Color - Sandstone, Aluminum	
F207-2	Wind Rating - 150 MPH, Aluminum Housing	
H657-2	Distribution Panel - Prewired AC Features	
K102-2	Service Receptacle - 120V, 20A, External GFCI, NEMA 5 - 20R	
C209-2	Fuel Tank - Sub Base, 1700 Gallon, UL142 Compliant	
L163-2	Listing, ULC - S601 - 07	
C215-2	Alarm - High Fuel Fill	
C127-2	Fuel Water Separator	
H609-2	Control Mounting - Left Facing	
H704-2	PowerCommand 3.3 Controller, Paralleling Capable	
A460-2	Control Cabinet Heater, 120/240 Volt AC Compatible	
H678-2	LCD Control Display	
H720-2	AmpSentryTM UL Listed Protective Relay	
K631-2	Relays - Genset Status, User Configured	
KA08-2	Alarm - Audible, Engine Shutdown	
KS53-2	Signals - Auxiliary, 8 Inputs/8 Outputs	
KU32-2	Relay - Alarm Shutdown	
KU67-2	Relays - Paralleling Circuit Breaker Control	
H536-2	Control Display Language - English	
KU94-2	Circuit Breaker or Entrance Box or Terminal Box - Right Only	
3250	Circuit Breaker or Terminal Box, Left-None	
KC52-2	Terminal Box - Low Voltage, Right	
3251	Circuit Breaker or Entrance Box or Terminal Box, Left-None	
KB72-2	Bottom Entry, Right	
D036-2	Engine Air Cleaner - Heavy Duty	
B786-2	External Battery Charger - 12 Amp, Regulated	
E074-2	Engine Cooling - Radiator, 50C Ambient	
H389-2	Shutdown - Low Coolant Level	
H557-2	Coolant Heater - 208/240/480 Volts AC, Below 40F Ambient Temperature	
L010-2	Test Record - Strip Chart	
L023-2	Test Record - Safety Shutdowns	
L189-2	Standby 5 Year 2500 Hour Parts+Labor+Travel	
L050-2	Literature - English	
A412-2	Packing - None, Base Mounted Housing	
A045J201	Annunciator-panel mount with enclosure (RS485) – Ships Loose for Others to Install	1
NSBOP29	Spare parts: (1) set of oil, air and fuel filters, (1) set of spare belts	1
NSBOP34	IBC compliant extended vents, 5 gallon spill box and overfill prevention valve	1
ACC-BAT-8D-B	Generator starting batteries, Group 8D	2
NSBOP26	Delivery to site, off-loading by others	1

EXCEPTIONS AND CLARIFICATIONS:

Specification 26 32 00 pages 1 through 14 reviewed for this proposal. No drawings provided or reviewed. All other specifications are excluded.

2.01: Drawings not provided, cannot confirm equipment will fit without drawings
2.08: Vibration isolators are Cummins factory standard and are what is recommended for this model and application
COVID 19 SUPPLEMENTAL STATEMENT
AS A RESULT OF THE OUTBREAK OF THE DISEASE COVID-19 ARISING FROM THE NOVEL CORONAVIRUS, TEMPORARY DELAYS IN DELIVERY, LABOUR OR SERVICES FROM CUMMINS AND ITS SUB-SUPPLIERS OR SUBCONTRACTORS MAY OCCUR. AMONG OTHER FACTORS, CUMMINS' DELIVERY OBLIGATIONS ARE SUBJECT TO CORRECT AND PUNCTUAL SUPPLY FROM OUR SUB-SUPPLIERS OR SUBCONTRACTORS, AND CUMMINS RESERVES THE RIGHT TO MAKE PARTIAL DELIVERIES OR MODIFY ITS LABOUR OR SERVICE. WHILE CUMMINS SHALL MAKE EVERY COMMERCIALLY REASONABLE EFFORT TO MEET THE DELIVERY, SERVICE OR COMPLETION OBLIGATIONS SET FORTH HEREIN, SUCH DATES ARE SUBJECT TO CHANGE.
INTERNATIONAL BUILDING CODE (IBC) CERTIFICATION
The products in this quotation identified as meeting the requirements of the 2009 IBC have been certified by their respective manufactures via a combination of analytical testing and shaker table testing. Not all products have been shaker table tested.
OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT (OSHPD)
OSHPD seismic requirements are continuing to evolve. Please contact Cummins for the most current requirements for meeting OSHPD applications.
SELECTIVE COORDINATION FOR NATIONAL ELECTRIC CODE (NEC) ARTICLE 700 AND 701 LOADS
Cummins generators are equipped with the manufacturer's recommended circuit breaker. Information regarding this device can be supplied upon request. This quotation is not valid if any changes to this circuit breaker(s) is required to coordinate with other devices in the electrical distribution system. If changes are required, the customer must provide a copy of the coordination study listing the manufacturers part number of the disconnect device to be supplied with the generator and a revised quotation will be issued.
TRANSFER SWITCH WITHSTAND AND CLOSE RATINGS
Transfer switch(es), if included in this quotation, require a withstand and closing rating (WCR) capable of meeting the available upstream fault current (kAIC). The WCR may be based on a specific breaker rating or a time-based rating, and it is the responsibility of a qualified facility designer or engineer to verify compatibility. In the event that the proposed transfer switch(es) are not compatible, the transfer switch(es) will need to be re-quoted to ensure compatibility. A full listing of the WCR can be provided upon request and will be included as part of the submittal package.

CUMMINS STANDARD EXCLUSIONS
Exhaust System
All off-engine piping, hangers, flanges, gaskets, bolts, insulation, other materials and labor to install.
Fuel System
All fuel piping and materials not limited to; supply, return, venting, valves, coolers, filters, pumps, fittings, primary fuel regulator, storage tank & senders, external to genset package. All fuel for testing and initial fill. Fuel tank vent extensions and flame arrestors unless specifically listed in the Bill of Materials.
Cooling System
Intake louvers, exhaust louvers, air dampers, sheet metal ducting, flex adapters, sound
attenuators/baffles. All off engine piping, flexible connections, labor and coolant for remote cooling systems.
Electrical
All off-engine wiring, field terminations of wiring, and lugs other than those detailed in our submittal. Mounting
Mounting bolts and anchors. Vibration isolators (if included) may be shipped loose for installation at the jobsite by others. Seismic engineering calculations.
Electrical Testing
Not limited to International Electrical Testing Association (NETA), infrared scanning, harmonic content or other independent agency testing of switchgear, switchboards, protective relays, circuit breaker, electrical coordination studies, arc flash studies and reactive load site testing.
Environmental Testing
Environmental Protection Agency (EPA), local air quality district or other Authority Having Jurisdiction
(AHJ), including acoustical.
Programming
All protective relay settings, breaker settings, PLC programming or other user configurable device programming.
Documentation
Electronic submittals and operation and maintenance manuals will be provided. Printed copies are available upon request, additional charges may apply.
Miscellaneous
Site specific labeling. Exhaust backpressure, airflow restriction or vibration analysis
Design
Cummins is not responsible for system design or engineering and does not guarantee system performance standards. Cummins will supply documentation and reasonable assistance to others responsible for system engineering, design and performance.
Taxes and Permit
Any applicable sales tax, permits, fees, licenses.
Bonds

Any bid bond, payment or performance bond or other type of bond.
All items listed above are excluded and will only be supplied by Cummins if agreed upon, in writing, by a sales representative for Cummins.

NOTES:

All start up labor to be provided on a separate quote/contract.

Power Generation

DFEK Generator Information

Specification sheet

Diesel generator set QSX15 series engine

450 kW – 500 kW Standby

Description

Cummins® commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary standby and prime power applications.

Features

Cummins heavy-duty engine - Rugged 4-cycle, industrial diesel delivers reliable power, low emissions and fast response to load changes.

Alternator - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

Permanent Magnet Generator (PMG) - Offers enhanced motor starting and fault clearing short-circuit capability.

Control system - The PowerCommand® electronic control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, AmpSentry™ protection, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

Cooling system - Standard integral set-mounted radiator system, designed and tested for rated ambient temperatures, simplifies facility design requirements for rejected heat.

Enclosures - Optional weather protective and sound attenuated enclosures are available.

Fuel tanks - Dual wall sub-base fuel tanks are also available.

NFPA - The genset accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

Warranty and service - Backed by a comprehensive warranty and worldwide distributor network.

	Standby rating	Prime rating	Continuous rating	Data sheets
Model	60 Hz kW (kVA)	60 Hz kW (kVA)	60 Hz kW (kVA)	60 Hz
DFEJ	450 (563)	410 (513)		D-3400
DFEK	500 (625)	455 (569)		D-3401

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Generator set specifications

Governor regulation class	ISO 8528 part 1 Class G3
Voltage regulation, no load to full load	± 0.5%
Random voltage variation	± 0.5%
Frequency regulation	Isochronous
Random frequency variation	± 0.25%
EMS compatibility	IEC 61000-4-2: Level 4 Electrostatic discharge IEC 61000-4-3: Level 3 Radiated susceptibility

Engine specifications

Design	Turbocharged with air-to-air charge air-cooling
Bore	136.9 mm (5.39 in.)
Stroke	168.9 mm (6.65 in.)
Displacement	14.9 L (912.0 in^3)
Cylinder block	Cast iron with replaceable wet liners, in-line 6 cylinder
Battery capacity	1400 Amps minimum at ambient temperature 0 ℃ (32 ℉)
Battery charging alternator	35 Amps
Starting voltage	24 volt, negative ground
Fuel system	Full authority electronic (FAE) Cummins HPI-TP
Fuel filter	
Air cleaner type	
Lube oil filter type(s)	Single spin-on combination full flow and bypass filters
Standard cooling system	40 ºC (104 ºF) ambient radiator

Alternator specifications

Design	Brushless, 4 pole, drip-proof revolving field
Stator	2/3 pitch
Rotor	Single bearing, flexible discs
Insulation system	Class H
Standard temperature rise	125 ℃ standby at 40 ℃ ambient
Exciter type	PMG (Permanent Magnet Generator)
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower fan
AC waveform total harmonic distortion (THDV)	< 5% no load to full linear load, < 3% for any single harmonic
Telephone influence factor (TIF)	< 50% per NEMA MG1-22.43
Telephone harmonic factor (THF)	< 3%

Available voltages

60 Hz Line – Neutral/Line - Line

- 110/190
- 110/220
- 115/200
- 115/230
- 120/208
- 127/220
- 139/240
- 220/380
- 230/400
- 240/416
- 255/440
- 277/480
- 347/600

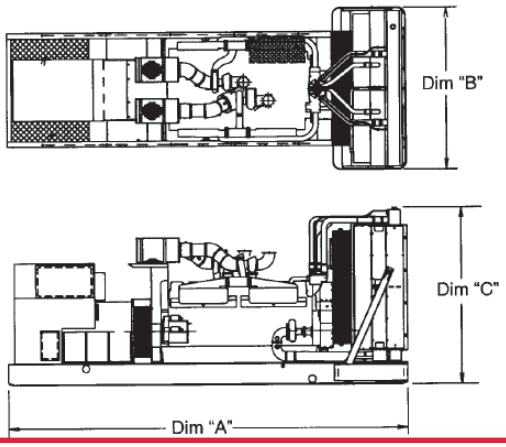
Note: Consult factory for other voltages.

Emergency Standby Power (ESP):
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Limited-Time running Power (LTP):
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

Prime Power (PRP):
Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Base Load (Continuous) Power (COP):
Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.



This outline drawing if for reference only. See respective model data sheet for specific model outline drawing number.

Do not use for installation design

Model	Dim 'A' mm (in.)	Dim 'B' mm (in.)	Dim 'C' mm (in.)	Set weight dry* kg (lbs)	Set weight wet* kg (lbs)
DFEJ	3864 (152.1)	1524 (60.0)	1812 (71.3)	4098 (9035)	4234 (9335)
DFEK	3864 (152.1)	1524 (60.0)	1812 (71.3)	4325 (9535)	4461 (9835)

*Weights represent a set with standard features. See outline drawings for weights of other configurations.

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Codes and standards

Codes or standards compliance may not be available with all model configurations – consult factory for availability.

	This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.		The generator set is available listed to UL 2200, Stationary Engine Generator Assemblies for all 60 Hz low voltage models. The PowerCommand control is Listed to UL 508 - Category NITW7 for U.S. and Canadian usage. Circuit breaker assemblies are UL 489 Listed for 100% continuous operation and also UL 869A Listed Service Equipment.
	The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.	**U.S EPA**	Engine certified to Stationary Emergency U.S. EPA New Source Performance Standards, 40 CFR 60 subpart IIII Tier 2 exhaust emission levels. U.S. applications must be applied per this EPA regulation.
	All low voltage models are CSA certified to product class 4215-01.	**International Building Code**	The generator set package is available certified for seismic application in accordance with the following International Building Code: IBC2000, IBC2003, IBC2006, IBC2009 and IBC2012.

Warning: Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

For more information contact your local Cummins distributor or visit power.cummins.com

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S-1582 (08/17)

Generator set data sheet

Model:	**DFEK**
Frequency:	**60 Hz**
Fuel type:	**Diesel**
kW rating:	**500 Standby**
	455 Prime
Emissions level:	**EPA NSPS Stationary Emergency Tier 2**

Exhaust emission data sheet:	**EDS-173**
Exhaust emission compliance sheet:	**EPA-1005**
Sound performance data sheet:	**MSP-177**
Cooling performance data sheet:	**MCP-105**
Prototype test summary data sheet:	**PTS-145**
Standard set-mounted radiator cooling outline:	**0500-3326**
Optional set-mounted radiator cooling outline:	
Optional heat exchanger cooling outline:	
Optional remote radiator cooling outline:	

Fuel consumption

	Standby				**Prime**				**Continuous**
	kW (kVA)				**kW (kVA)**				**kW (kVA)**
Ratings	500 (625)				455 (569)				
Load	**1/4**	**1/2**	**3/4**	**Full**	**1/4**	**1/2**	**3/4**	**Full**	**Full**
US gph	11.6	18.8	25.7	34.4	10.9	17.6	23.7	30.4	
L/hr	44	71	97	130	41	67	90	115	

Engine

	Standby rating	**Prime rating**	**Continuous rating**
Engine manufacturer	Cummins Inc.		
Engine model	QSX15-G9		
Configuration	Cast iron with replaceable wet cylinder liners, in-line 6 cylinder		
Aspiration	Turbocharged with air-to-air charge air-cooling		
Gross engine power output, kWm (bhp)	563.0 (755.0)	507.3 (680.0)	
BMEP at set rated load, kPa (psi)	2433.9 (353.0)	2213.2 (321.0)	
Bore, mm (in.)	136.9 (5.39)		
Stroke, mm (in.)	168.9 (6.65)		
Rated speed, rpm	1800		
Piston speed, m/s (ft/min)	10.1 (1995.0)		
Compression ratio	17.0:1		
Lube oil capacity, L (qt)	83.3 (88.0)		
Overspeed limit, rpm	2150 ± 50		
Regenerative power, kW	52.00		

Fuel flow	Standby rating	Prime rating	Continuous rating
Maximum fuel flow, L/hr (US gph)	423.9 (112.0)		
Maximum inlet restriction, mm Hg (in Hg)	127.0 (5.0)		
Maximum return restriction, mm Hg (in Hg)	165.1 (6.5)		

Air			
Combustion air, m^3/min (scfm)	41.6 (1470.0)	38.8 (1370.0)	
Maximum air cleaner restriction, kPa (in H_2O)	6.2 (25.0)		
Alternator cooling air, m^3/min (scfm)	62.0 (1290.0)		

Exhaust			
Exhaust flow at set rated load, m^3/min (cfm)	102.6 (3625.0)	88.7 (3135.0)	
Exhaust temperature, °C (°F)	482.8 (901.0)	466.7 (872.0)	
Maximum back pressure, kPa (in H_2O)	10.2 (41.0)		

Standard set-mounted radiator cooling			
Ambient design, °C (°F)	40 (104)		
Fan load, kW_m (HP)	19 (25.5)		
Coolant capacity (with radiator), L (US gal)	57.9 (15.3)		
Cooling system air flow, m^3/min (scfm)	707.5 (25000.0)		
Total heat rejection, MJ/min (Btu/min)	19.6 (18485.0)	17.7 (16680.0)	
Maximum cooling air flow static restriction, kPa (in H_2O)	0.12 (0.5)		

Optional set-mounted radiator cooling			
Ambient design, °C (°F)	50 (122)		
Fan load, kW_m (HP)	19 (25.5)		
Coolant capacity (with radiator), L (US gal)	57.9 (15.3)		
Cooling system air flow, m^3/min (scfm)	707.5 (25000.0)		
Total heat rejection, MJ/min (Btu/min)	19.6 (18485.0)	17.7 (16680.0)	
Maximum cooling air flow static restriction, kPa (in H_2O)	0.12 (0.5)		

Optional heat exchanger cooling			
Set coolant capacity, L (US Gal.)			
Heat rejected, jacket water circuit, MJ/min (Btu/min)			
Heat rejected, after-cooler circuit, MJ/min (Btu/min)			
Heat rejected, fuel circuit, MJ/min (Btu/min)			
Total heat radiated room, MJ/min (Btu/min)			
Maximum raw water pressure, jacket water circuit, kPa (psi)			
Maximum raw water pressure, after-cooler circuit, kPa (psi)			
Maximum raw water pressure, fuel circuit, kPa (psi)			
Maximum raw water flow, jacket water circuit, L/min (US gal/min)			
Maximum raw water flow, after-cooler circuit, L/min (US gal/min)			
Maximum raw water flow, fuel circuit, L/min (US gal/min)			
Minimum raw water flow at 27 °C (80 °F) inlet temp, jacket water circuit, L/min (US gal/min)			
Minimum raw water flow at 27 °C (80 °F) inlet temp, after-cooler circuit, L/min (US gal/min)			
Minimum raw water flow at 27 °C (80 °F) inlet temp, fuel circuit, L/min (US gal/min)			

Optional heat exchanger cooling (continued)

Raw water delta P at min flow, jacket water circuit, kPa (psi)			
Raw water delta P at min flow, after-cooler circuit, kPa (psi)			
Raw water delta P at min flow, fuel circuit, kPa (psi)			
Maximum jacket water outlet temp, °C (°F)			
Maximum after-cooler inlet temp, °C (°F)			
Maximum after-cooler inlet temp at 25 °C (77 °F) ambient, °C (°F)			

Optional remote radiator cooling[1]

Set coolant capacity, L (US gal)	
Max flow rate at max friction head, jacket water circuit, L/min (US gal/min)	
Max flow rate at max friction head, after-cooler circuit, L/min (US gal/min)	
Heat rejected, jacket water circuit, MJ/min (Btu/min)	
Heat rejected, after-cooler circuit, MJ/min (Btu/min)	
Heat rejected, fuel circuit, MJ/min	
Total heat radiated to room, MJ/min (Btu/min)	
Maximum friction head, jacket water circuit, kPa (psi)	
Maximum friction head, after-cooler circuit, kPa (psi)	
Maximum static head, jacket water circuit, m (ft)	
Maximum static head, after-cooler circuit, m (ft)	
Maximum jacket water outlet temp, °C (°F)	
Maximum after-cooler inlet temp at 25 °C (77 °F) ambient, °C (°F)	
Maximum after-cooler inlet temp, °C (°F)	
Maximum fuel flow, L/hr (US gph)	
Maximum fuel return line restriction, kPa (in Hg)	

Weights[2]

Unit dry weight kgs (lbs)	4325 (9535)
Unit wet weight kgs (lbs)	4461 (9835)

Notes:

[1] For non-standard remote installations contact your local Cummins representative.

[2] Weights represent a set with standard features. See outline drawing for weights of other configurations.

Derating factors

Standby	Genset may be operated at up to 1400 m (4593 ft) and 40°C (104°F) without power deration. For sustained operation above these conditions, derate by 3.1% per 305 m (1000 ft), and 9% per 10°C (9% per 18°F). Genset may be operated at up to 500 m (1640 ft) and 50°C (122°F) without power deration. For sustained operation above these conditions, derate by 3% per 305 m (1000 ft), and 9.5% per 10°C (9% per 18°F).
Prime	Genset may be operated at up to 2250 m (7382 ft) and 40°C (104°F) without power deration. For sustained operation above these conditions, derate by 3.2% per 305 m (1000 ft), and 16.6% per 10°C (16.6% per 18°F). Genset may be operated at up to 1600 m (5249 ft) and 50°C (122°F) without power deration. For sustained operation above these conditions, derate by 3.2% per 305 m (1000 ft), and 16.6% per 10°C (16.6% per 18°F).
Continuous	

Ratings definitions

Emergency Standby Power (ESP):	**Limited-Time Running Power (LTP):**	**Prime Power (PRP):**	**Base Load (Continuous) Power (COP):**
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.	Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.	Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.	Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) is in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.

Alternator data

Three phase table[1]		105 °C	105 °C	105 °C	125 °C	125 °C	125 °C	125 °C	125 °C	150 °C	150 °C	150 °C	150 °C
Feature code		B262	B301	B252	B258	B252	B414	B246	B300	B426	B413	B424	B419
Alternator data sheet number		308	307	307	308	307	308	306	306	307	307	305	306
Voltage ranges		110/190 thru 139/240 220/380 thru 277/480	347/600	120/208 thru 139/240 240/416 thru 277/480	110/190 thru 139/240 220/380 thru 277/480	120/208 thru 139/240 240/416 thru 277/480	120/208 thru 139/240 240/416 thru 277/480	277/480	347/600	110/190 thru 139/240 220/380 thru 277/480	120/208 thru 139/240 240/416 thru 277/480	277/480	347/600
Surge kW		514	517	514	514	514	516	515	515	512	514	512	515
Motor starting kVA (at 90% sustained voltage)	Shunt												
	PMG	2429	2208	2208	2429	2208	2429	1896	1896	2208	2208	1749	1896

Full load current - amps at Standby rating	110/190	120/208	110/220	115/230	139/240	220/380	230/400	240/416	255/440	277/480	347/600	
	1901	1737	1642	1571	1505	951	903	868	821	753	602	

Note:

[1] Single phase power can be taken from a three phase generator set at up to 40% of the generator set nameplate kW rating at unity power factor.

Formulas for calculating full load currents:

Three phase output

$$\frac{\text{kW} \times 1000}{\text{Voltage} \times 1.73 \times 0.8}$$

Single phase output

$$\frac{\text{kW} \times \text{SinglePhaseFactor} \times 1000}{\text{Voltage}}$$

Warning: Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

For more information contact your local Cummins distributor or visit power.cummins.com

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D-3401 (04/20)

Specification Sheet

PowerCommand® 3.3 Generator Set Digital Integrated Control System

Bargraph Optional

Introduction

The PowerCommand® 3.3 control system is a microprocessor-based generator set monitoring, metering, and control system, which is comprised of PowerCommand® Control 3300 and the Human Machine Interface 320. PCC3300 supports multiple operation modes including:

- Standalone,
- Synchronization only,
- Isolated bus paralleling,
- Utility single generator set paralleling,
- Utility multiple generator set paralleling,
- Utility single generator set paralleling with power transfer control (automatic mains failure),
- Isolated bus paralleling with Masterless Load Demand

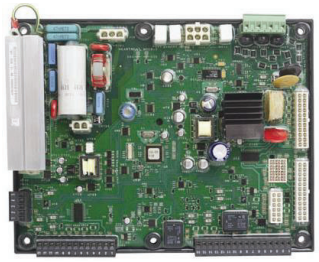
PowerCommand® Control 3300 is designed to meet the exacting demands of the harsh and diverse environments of today's typical power generation applications for Full Authority Electronic or Hydromechanical engine power generator sets.

Offering enhanced reliability and performance over more conventional generator set controls via the integration of all generator control functions into a single system, PCC3300 is your Power of One generator set control solution.

Benefits and Features

- 320 x 240 pixels graphical LED backlit LCD
- Multiple languages supported
- AmpSentry™ protection provides industry-leading generator overcurrent protection
- Digital Power Transfer Control (Automatic Mains Failure) provides load transfer operation in open transition, closed transition, or soft (ramping) transfer modes
- Extended Paralleling (Peak Shave/Base Load) regulates the genset real and reactive power output while paralleled to the utility. Power can be regulated at either the genset or utility bus monitoring point
- Digital frequency synchronization and voltage matching
- Isochronous Load Sharing
- Droop kW and kVAr control
- Real time clock for fault and event time stamping
- Exerciser clock and time of day start/stop initiate a test with or without load, or a Base Load or Peak Shave session
- Digital automatic voltage regulation is provided using three phase sensing and full wave FET type regulator, which is compatible with either shunt or PMG excited systems with a standard AUX103 AVR or an option for a more powerful high-current field drive capability AUX106 AVR
- Digital engine speed governing is provided on applicable platforms
- Generator set monitoring (including metering) and protection with PCC3300 measuring voltage, current, kW and kVAr offering a measurement accuracy of 1%
- Utility / AC Bus metering and protection with PCC3300 voltage, current, kW and kVAr offering a measurement accuracy of 1%
- 12 V (DC) and 24 V (DC) battery operation
- RS-485 Modbus® interface for interconnecting to customer equipment
- Warranty and service – Cummins Power Generation offers a comprehensive warranty and worldwide distributor service network
- Global regulatory certification and compliance: PCC3300 is suitable for use on gensets that are designed, manufactured, tested and certified to relevant UL, NFPA, ISO, IEC, Mil Std., UKCA, and CE standards

PowerCommand® Generator Set Digital Control System PCC 3300



Introduction

PCC3300 is an industry-leading digital generator set control suitable for usage on a wide range of diesel and lean burn natural gas generator sets in both standalone as well as paralleling applications.

PowerCommand® is compatible with either shunt or PMG excitation, and is suitable for usage with reconnectable or non-reconnectable generators. Configuration for any frequency, voltage and power connection from 120 V (AC) to 600 V (AC) line-to-line or 601 V (AC) to 45k V (AC) with an external PT is supported. The PCC3300 derives its own power from the generator set starting batteries and functions over a voltage range of 8 V (DC) to 30 V (DC).

Features

- PCC3300 supports configurable control features via software download using InPower PC-compatible software
- 12 V (DC) and 24 V (DC) battery operation
- Digital automatic voltage regulation is provided using three phase sensing and full wave FET type regulator, which is compatible with either shunt or PMG excited systems with a standard AUX103 AVR or an option for a more powerful high-current field drive capability AUX106 AVR
- Digital engine speed governing on applicable platform is provided, which is capable of providing isochronous frequency regulation
- Full authority J1939 CANBus® prime mover communications and control is provided for platforms with an Engine Control Module (ECM)
- AmpSentry" protection provides industry-leading alternator overcurrent protection:
  - Time-based generator protection applicable to both line-to-line and line-to-neutral, that can detect an unbalanced fault condition and swiftly react appropriately. Balanced faults can also be detected by AmpSentry and appropriate acted upon.
  - Reduces the risk of Arc Flash due to thermal overload or electrical faults by inverse time protection
- Generator set monitoring offers status information for all critical prime mover and generator functions
- AC and DC digital generator set metering is provided. AC measurements are configurable for single or three phase sensing with PCC3300 measuring voltage, current, kW and kVAr offering a measurement accuracy of 1%
- Battery monitoring system continually monitors the battery output and warns of the potential occurrence of a weak battery condition
- Relay drivers for prime mover starter, fuel shutoff (FSO), glow plug/spark ignition power and switched B+ applications are provided
- Integrated generator set protection is offered to protect the prime mover and generator
- Real time clock for fault and event time stamping
- Exerciser clock and time of day start/stop initiate a test with or without load, or a Base Load or Peak Shave session
- Digital Power Transfer Control (Automatic Mains Failure) provides load transfer operation in open transition, closed transition, or soft (ramping) transfer modes
- Extended Paralleling (Peak Shave/Base Load) regulates the genset real and reactive power output while paralleled to the utility. Power can be regulated at either the genset or utility bus monitoring point
- Digital frequency synchronization and voltage matching
- Isochronous Load Sharing
- Droop kW and kVAr Control
- The synchronization check function provides adjustments for phase angle window, voltage window, frequency window and time delay
- Utility / AC Bus metering and protection with PCC3300 voltage, current, kW and kVAr offering a measurement accuracy of 1%
- Advanced serviceability is offered via InPower™, a PC-based software service tool
- PCC3300 is designed for reliable operation in harsh environments with the unit itself being a fully encapsulated module
- RS-485 ModBus interface for interconnecting to customer equipment
- Native on PCC3300: Four discrete inputs, two dry contact relay outputs and two low-side driver outputs are provided and are all configurable.
  - Optional extra PCC3300 input and output capability available via AUX101
- Warranty and service – Cummins Power Generation offers a comprehensive warranty and worldwide distributor service network
- Global regulatory certification and compliance: PCC3300 is suitable for use on gensets that are designed, manufactured, tested and certified to relevant UL, NFPA, ISO, IEC, Mil Std., UKCA and CE standards

Base Control Functions

HMI capability

Options: Local and remote HMI320 options are available

Operator adjustments: The HMI320 includes provisions for many set up and adjustment functions.

Genset hardware data: Access to the control and software part number, genset rating in kVA and genset model number is provided from the HMI320 or InPower.

Data logs: Information concerning all of the following parameters is periodically logged and available for viewing; engine run time, controller on time, number of start attempts, total kilowatt hours, and load profile. (Control logs data indicating the operating hours at percent of rated kW load, in 5% increments. The data is presented on the operation panel based on total operating hours on the generator.)

Fault history: Provides a record of the most recent fault conditions with control date and time stamp. Up to 32 events are stored in the control non-volatile memory.

Alternator data

- Voltage (single or three phase line-to-line and line-to-neutral)
- Current (single or three phase)
- kW, kVAr, Power Factor, kVA (three phase and total)
- Frequency

For Lean Burn Natural Gas Engine applications:

- Alternator heater status
- Alternator winding temperature (per phase) as well as alternator drive end and non-drive end bearing

Utility/AC bus data

- Voltage (three phase line-to-line and line-to-neutral)
- Current (three phase and total)
- kW, kVAR, Power Factor, kVA (three phase and total)
- Frequency

AmpSentry: 3x current regulation for downstream tripping/motor inrush management. Thermal damage curve (3-phase short) or fixed timer (2 sec for 1-Phase Short or 5 sec for 2-Phase short).

Engine data

- Starting battery voltage
- Engine speed
- Engine temperature
- Engine oil pressure
- Engine oil temperature
- Intake manifold temperature
- Coolant temperature
- Comprehensive Full Authority Engine (FAE) data (where applicable)

Lean Burn Natural Gas (LBNG) application parameters include:

- Safety shutoff valve status
- Valve proving status
- Downstream gas pressure
- Gas inlet pressure
- Gas mass flow rate
- Control valve position
- Gas outlet pressure
- Manifold pressure and temperature
- Throttle position
- Compressor outlet pressure
- Turbo speed
- Compressor bypass position
- Cylinder configuration (e.g., drive end and non-drive end configurations)
- Coolant pressure 1 and 2 as well as coolant temperature 1 and 2 for both HT/LT respectively
- Exhaust port temperature (up to 18 cylinders)
- Pre-filter oil pressure
- Exhaust back pressure
- Parent ECM internal temperature and isolated battery voltage
- Speed bias
- Child ECM internal temperature and isolated battery voltage
- Knock level, spark advance, and knock count (for up to 18 cylinders)
- Auxiliary supply disconnector status
- Engine heater status
- Coolant circulating pump status
- Lube oil priming pump status
- Lube oil status
- Oil heater status
- Derate authorization status
- Start system status
- Ventilator fan status
- Ventilation louvre status
- Radiator fan status
- DC PSU status
- Start inhibit/enable status and setup

Service adjustments – The HMI320 includes provisions for adjustment and calibration of genset control functions. Adjustments are protected by a password. Functions include:

- Engine speed governor adjustments
- Voltage regulation adjustments
- Cycle cranking
- Configurable fault set up
- Configurable input and output set up
- Meter calibration
- Paralleling setup
- Display language and units of measurement

Prime Mover Control

SAE-J1939 CAN interface to full authority ECMs (where applicable). Provides data transfer between genset and engine controller for control, metering and diagnostics.

12 V (DC) or 24 V (DC) nominal battery voltage is supported by PCC3300 for normal operation.

Temperature dependant prime mover governing dynamics: This function is supported enabling the engine to be responsive when warm and more stable when operating at lower temperature via providing control and modification over electronic governing parameters as a function of engine temperature.

Isochronous governing is provided in order to control prime mover speed within ±0.25% of nominal rated speed for any steady state load from no load to full load. During operation frequency drift should not exceed ±0.5% of nominal frequency given a 33ºC (or 60ºF) chance in ambient temperature within an eight-hour period.

Droop electronic speed is governing capability is natively offered by PCC3300 to permit droop from 0% to 10% between no load to full load.

Remote start capability is built into the PCC3300 as the unit accepts a ground signal from remote devices to automatically command the starting of the generator set as well as the reaching of rated speed, voltage and frequency or otherwise run at idle speed until prime mover temperature is adequate. The presence of a remote start signal shall cause the PCC3300 to leave sleep mode and return to normal power mode. PCC3300 supports an option for delayed start or stop.

Remote Start Integrity: In compliance with NEC2017 Start Signal Integrity standard – NFPA70 Article 700.10(D)(3), the remote start circuit from ATS to PCC3300 is continuously monitored for signal disturbance due to broken, disconnected or shorted wires via a configurable input. Loss of signal integrity results in activation of a remote start signal.

Remote and local emergency stopping capability: PCC3300 accepts ground signal from a locally or remoted mounted emergency stop switch to cause the generator set to immediately shutdown. The generator set is prevented from either running or cranking with the emergency stop switch engaged. If PCC3300 is in sleep mode, then the activation of any emergency stop switch shall return PCC3300 is normal powered state along with the activation of the corresponding shutdown and run-prevention states.

Sleep mode: PowerCommand 3.3 supports a configurable low current draw state, which is design with consideration to the needs of prime applications or others application without a battery charger (in order to minimize battery current drain).

Automatic prime mover starting: Any generator set controlled by PCC3300 is capable of automatic starting achieved via either magnetic pickup or main alternator output frequency. PCC3300 additionally supports configurable glow plug control where applicable.

Prime mover cycle cranking: PCC3300 supports configurable starting cycles and rest periods. Built in starter protection are incorporated to prevent the operator from specifying a starting sequence that may be damaging.

Configurable time delay functionality: PCC3300 supports time delayed generator set starting and stopping (for cooldown). Permissible time delays are as follows (noting a default setting is 0 seconds):

1. Start delay: 0 seconds to 300 seconds prior to starting after receiving a remote start signal.
2. Stop delay: 0 seconds to 600 seconds prior to shut down after receiving a signal to stop in normal operation modes.

Lean Burn Natural Gas application specific parameters

PCC3300 supports prime mover inhibiting in order to permit application-specific processes (i.e. Auxiliaries) to be started first.

Generator Control

PCC3300 performs both Genset voltage sensing and Genset voltage regulation as follows:

- Voltage sensing is integrated into PCC3300 via three phase line-to-line sensing that is compatible with shunt or PMG excitation systems
- Automatic voltage regulation is accomplished by using a three phase fully rectified input and has a FET output for good motor starting capability.

Major features of generator control include:

Digital output voltage regulation - Capable of regulating output voltage to within +/-1.0% for any loads between no load and full load. Voltage drift will not exceed +/-1.5% for a 40 ºC (104 ºF) change in temperature in an eight-hour period. On engine starting or sudden load acceptance, voltage is controlled to a maximum of 5% overshoot over nominal level.

The automatic voltage regulator feature can be disabled to allow the use of an external voltage regulator.

Droop voltage regulation - Control can be adjusted to droop from 0-10% from no load to full load.

Torque-matched V/Hz overload control - The voltage roll-off set point and rate of decay (i.e. the slope of the V/Hz curve) is adjustable in the control.

Fault current regulation - PowerCommand® will regulate the output current on any phase to a maximum of three times rated current under fault conditions for both single phase and three phase faults. In conjunction with a permanent magnet generator, it will provide three times rated current on all phases for motor starting and short circuit coordination purpose.

Cylinder Cut-off System (CCS): PCC 3300 supports Cylinder Cut-off System which is used to operate the engines on half bank at no load and light load conditions. CCS has below benefits on engine

performance- improved emission standards, improved fuel efficiency, reduced hydrocarbons, reduced white smoke, reduced wet stacking and higher exhaust temperature at light loads to improve turbocharger operations and catalyst performance.

Step Timing Control (STC): PCC 3300 supports STC functionality which is used to advance the engine timing of a hydro-mechanical engine during start up and light load conditions. During ADVANCED injection timing, it:

- Improves cold weather idling characteristics
- Reduces cold weather white smoke
- Improves light load fuel economy
- Reduces injector carboning

Paralleling Functions

First Start Sensor™ system – PowerCommand® provides a unique control function that positively prevents multiple gensets from simultaneously closing to an isolated bus under black start conditions. The First Start Sensor system is a communication system between the gensets that allows the gensets to work together to determine which genset is a system should be the first to close to the bus. The system includes an independent backup function, so that if the primary system is disabled the required functions are still performed.

Synchronizing – Control incorporates a digital synchronizing function to force the genset to match the frequency, phase and voltage of another source such as a utility grid. The synchronizer includes provisions to provide proper operation even with highly distorted bus voltage waveforms. The synchronizer can match other sources over a range of 60-110% of nominal voltage and -24 to +6 hertz. The synchronizer function is configurable for slip frequency synchronizing for applications requiring a known direction of power flow at instant of breaker closure or for applications where phase synchronization performance is otherwise inadequate.

Load sharing control – The genset control includes an integrated load sharing control system for both real (kW) and reactive (kVar) loads when the genset(s) are operating on an isolated bus. The control system determines kW load on the engine and kVar load on the alternator as a percent of genset capacity, and then regulates fuel and excitation systems to maintain system and genset at the same percent of load without impacting voltage or frequency regulation. The control can also be configured for operation in droop mode for kW or Kvar load sharing.

Load govern control– When PowerCommand® receives a signal indicating that the genset is paralleled with an infinite source such as a utility (mains) service, the genset will operate in load govern mode. In this mode the genset will synchronize and close to the bus, ramp to a pre-programmed kW and kVar load level, and then operate at that point. Control is adjustable for kW values from 0-100% of standby rating, and 0.7-1.0 power factor (lagging). Default setting is 80% of standby and 1.0 power factor. The control includes inputs to allow independent control of kW and kVar load level by a remote device while in the load govern mode. The rate of load increase and decrease is also adjustable in the control. In addition, the control can be configured for operation in kW or kVAR load govern droop.

Load demand control – The control system includes the ability to respond to an external signal to initiate load demand operation. On command, the genset will ramp to no load, open its paralleling breaker, cool down, and shut down. On removal of the command, the genset will immediately start, synchronize, connect, and ramp to its share of the total load on the system.

Sync check – The sync check function decides when permissive conditions have been met to allow breaker closure. Adjustable criteria are: phase difference from 0.1-20 deg, frequency difference from 0.001-1.0 Hz, voltage difference from 0.5-10%, and a dwell time from 0.5-5.0 sec. Internally the sync check is used to perform closed transition operations. An external sync check output is also available.

Genset and utility/AC bus source AC metering – The control provides comprehensive three phase AC metering functions for both monitored sources, including: 3-phase voltage (L-L and L-N) and current, frequency, phase rotation, individual phase and totalized values of kW, kVAR, kVA and Power Factor; totalized positive and negative kW-hours, kVAR-hours, and kVA-hours. Three wire or four wire voltage connection with direct sensing of voltages to 600V, and up to 45kV with external transformers. Current sensing is accomplished with either 5 amp or 1 CT secondaries and with up to 10,000 amp primary. Maximum power readings are 32,000kW/kVAR/kVA.

Power transfer control – provides integrated automatic power transfer functions including source availability sensing, genset start/stop and transfer pair monitoring and control. The transfer/retransfer is configurable for open transition, fast closed transition (less than 100msec interconnect time), or soft closed transition (load ramping) sequences of operation. Utility source failure will automatically start genset and transfer load, retransferring when utility source returns. Test will start gensets and transfer load if test with load is enabled. Sensors and timers include:

Under voltage sensor: 3-phase L-N or L-L under voltage sensing adjustable for pickup from 85-100% of nominal. Dropout adjustable from 75-98% of pickup. Dropout delay adjustable from 0.1-30 sec.

Over voltage sensor: 3-phase L-N or L-L over voltage sensing adjustable for pickup from 95-99% of dropout. Dropout adjustable from 105-135% of nominal. Dropout delay adjustable from 0.5-120 sec. Standard configuration is disabled and is configurable to enabled in the field using the HMI or InPower service tools.

Over/Under frequency sensor: Center frequency adjustable from 45-65 Hz. Dropout bandwidth adjustable from 0.3-5% of center frequency beyond pickup bandwidth. Pickup bandwidth adjustable from 0.3-20% of center frequency. Field configurable to enable.

Loss of phase sensor: Detects out of range voltage phase angle relationship. Field configurable to enable.

Phase rotation sensor: Checks for valid phase rotation of source. Field configurable to enable.

Breaker tripped: If the breaker tripped input is active, the associated source will be considered as unavailable.

Timers: Control provides adjustable start delay from 0 - 300sec, stop delay from 0 - 800sec, transfer delay from 0-120sec, retransfer delay from 0-1800sec, programmed transition delay from 0-60sec, and maximum parallel time from 0-1800sec.

Negative Sequence Current Protection: PCC3300 supports this protection natively in order to determine if the generator is at any point was running subject to negative phase sequencing.

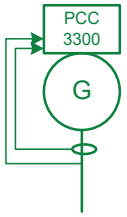
Breaker control – Utility and Genset breaker interfaces include separate relays for opening and closing breaker, as well as inputs for both 'a' and 'b' breaker position contacts and tripped status. Breaker diagnostics include Contact Failure, Fail to Close, Fail to Open, Fail to Disconnect, and Tripped. Upon breaker failure, appropriate control action is taken to maintain system integrity.

Exerciser clock –The exerciser clock (when enabled) allows the system to be operated at preset times in either test without load, test with load, or extended parallel mode. A Real Time Clock is built in. Up to 12 different programs can be set for day of week, time of day, duration, repeat interval, and mode. For example, a test with load for 1 hour every Tuesday at 2AM can be programmed. Up to 6 different exceptions can also be set up to block a program from running during a specific date and time period.

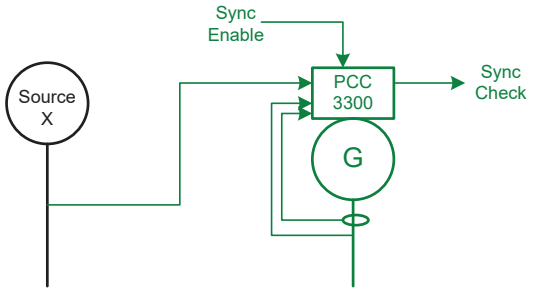
Extended paralleling – In extended paralleling mode (when enabled) the controller will start the genset and parallel to a utility source and then govern the real and reactive power output of the genset based on the desired control point. The control point for the real power (kW) can be configured for either the genset metering point ("Base Load") or the utility metering point ("Peak Shave"). The control point for the reactive power (kVAR or Power Factor) can also be independently configured for either the genset metering point or the utility metering point. This flexibility would allow base kW load from the genset while maintaining the utility power factor at a reasonable value to avoid penalties due to low power factor. The System always operates within genset ratings. The control point can be changed while the system is in operation. Set points can be adjusted via hardwired analog input or adjusted through an operator panel display or service tool.

Application types – Controller is configured to operating in one of six possible application types. These topologies are often used in combinations in larger systems, with coordination of the controllers in the system either by external device or by interlocks provided in the control. Topologies that may be selected in the control include:

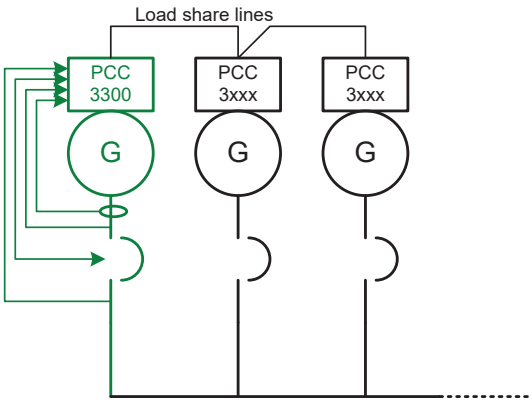
Standalone: Control provides monitoring, protection and control in a non-paralleling application.



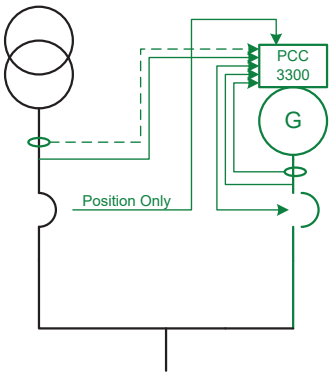
Synchronizer only: control will synchronize the genset to other source when commanded to either via a hardwired or Modbus driven input.



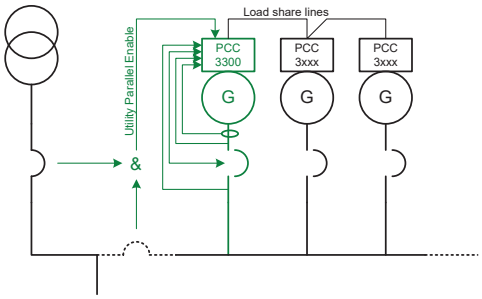
Isolated Bus: allows the genset to perform a dead bus closure or synchronize to the bus and isochronously share kW and kVAR loads with other gensets.



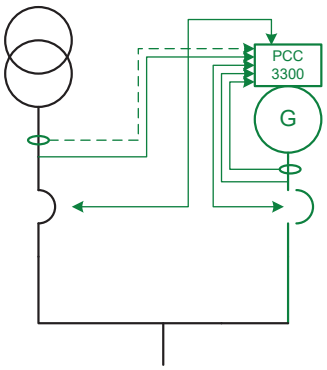
Utility Single: Control monitors one genset and utility. The control will automatically start and provide power to a load if the utility fails. The control will also resynchronize the genset back to the utility and provides extended paralleling capabilities.



Utility Multiple: Supports all functionality of Isolated Bus and provides extended paralleling to the utility. Extended paralleling load set points follow a constant setting; dynamically follow an analog input, Modbus register or HMI.

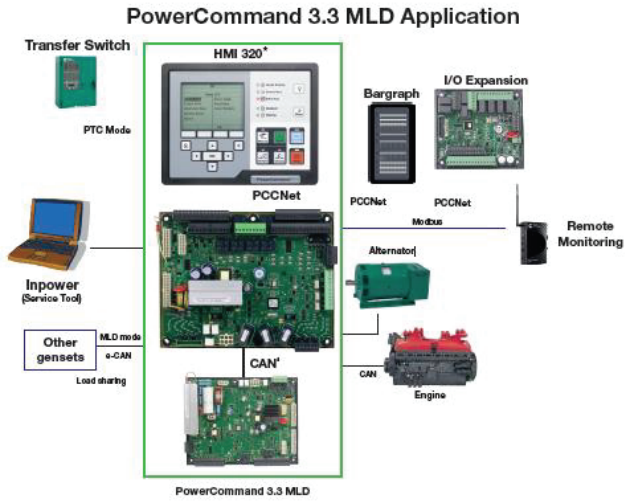


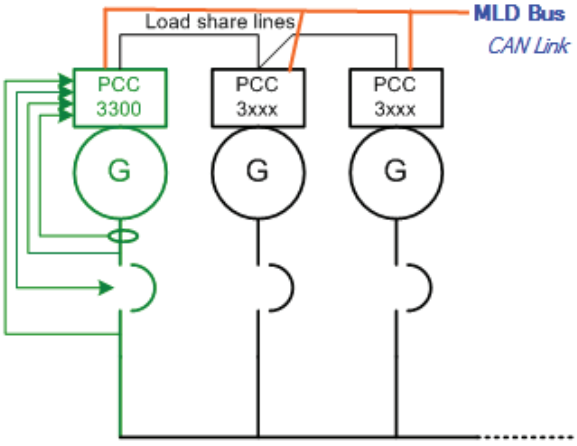
Power Transfer Control: Control operates a single genset/single utility transfer pair in open transition, fast closed transition, or soft closed transition. Extended paralleling functionality also provides base load and peak shave options.



Masterless Load Demand (Optional Feature):

PowerCommand® 3.3 with Masterless Load Demand (MLD) technology enables generator sets to start/stop automatically based on load demand. Masterless Load Demand-capable generators are equipped with an additional s-CAN network connection that allows sharing of information amongst paralleled generator sets. MLD has been designed for hassle-free installation, commissioning and operation. MLD functionality. Integrated on-board system logic provides the MLD topology control without the need for any additional system.





PCC3300 External Voltage and Frequency Biasing Inputs

PCC3300 supports externally driven voltage and frequency biasing capability in order to permit external paralleling (if intending to use this feature please contact your local distributor for further information).

Protective Functions

On operation of a protective function the control will indicate a fault by illuminating the appropriate status LED on the HMI, as well as display the fault code and fault description on the LCD. The nature of the fault and time of occurrence are logged in the control. The service manual and InPower service tool provide service keys and procedures based on the service codes provided. Protective functions include:

Battle short mode

When enabled and the *battle short* switch is active, the control will allow some shutdown faults to be bypassed. If a bypassed shutdown fault occurs, the fault code and description will still be annunciated, but the genset will not shutdown. This will be followed by a *fail to shutdown* fault. Emergency stop shutdowns and others that are critical for proper operation (or are handled by the engine ECM) are not bypassed. Please refer to the Control Application Guide or Manual for list of these faults.

Derate

The Derate function reduces output power of the genset in response to a fault condition. If a Derate command occurs while operating on an isolated bus, the control will issue commands to reduce the load on the genset via contact closures or Modbus. If a Derate command occurs while in utility parallel mode, the control will actively reduce power by lowering the base load kW to the derated target kW.

Configurable alarm and status inputs

The control accepts up to four alarm or status inputs (configurable contact closed to ground or open) to indicate a configurable (customer-specified) condition.

The control is programmable for warning, derate, shutdown, shutdown with cooldown or status indication and for labeling the input.

Emergency stop

Annunciated whenever either emergency stop signal is received from external switch.

General prime mover protection

Low and high battery voltage warning - Indicates status of battery charging system (failure) by continuously monitoring battery voltage.

Weak battery warning - The control system will test the battery each time the genset is signaled to start and indicate a warning if the battery indicates impending failure.

Low coolant level warning – Can be set up to be a warning or shutdown.

Low coolant temperature warning – Indicates that engine temperature may not be high enough for a 10 second start or proper load acceptance.

Fail to start (overcrank) shutdown - The control system will indicate a fault if the genset fails to start by the completion of the engine crack sequence.

Fail to crank shutdown - Control has signaled starter to crank engine but engine does not rotate.

Cranking lockout - The control will not allow the starter to attempt to engage or to crank the engine when the engine is rotating.

Fault simulation –The control in conjunction with InPower software, will accept commands to allow a technician to verify the proper operation of the control and its interface by simulating failure modes or by forcing the control to operate outside of its normal operating ranges. InPower also provides a complete list of faults and settings for the protective functions provided by the controller.

For Lean Burn Natural Gas Engine applications:

Off load running (protection) – This feature protects the engine in the event the genset is being called to go off load for too long.

Hydro Mechanical fuel system engine protection:

Overspeed shutdown – Default setting is 115% of nominal

Low lube oil pressure warning/shutdown – Level is preset (configurable with InPower or HMI) to match the capabilities of the engine used. Control includes time delays to prevent nuisance alarms.

High lube oil temperature warning/shutdown – Level is preset (configurable with InPower or HMI) to match the capabilities of the engine used. Control includes time delays to prevent nuisance alarms.

High engine temperature warning/shutdown – Level is preset (configurable with InPower or HMI) to match the capabilities of the engine used. Control includes time delays to prevent nuisance alarms.

Low coolant temperature warning – Indicates that engine temperature may not be high enough for a 10 second start or proper load acceptance.

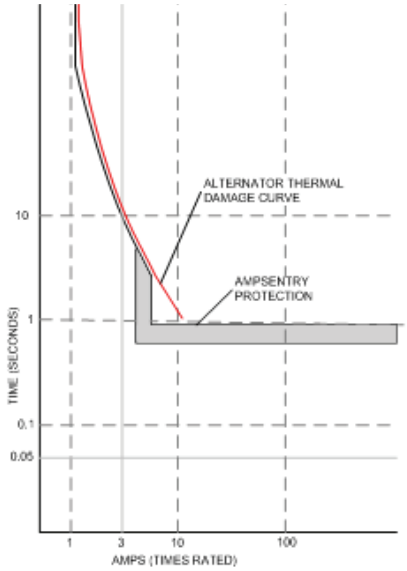
High intake manifold temperature shutdown – Level is preset (configurable with InPower or HMI) to match the capabilities of the engine used. Control includes time delays to prevent nuisance alarms.

Full authority electronic engine protection:

Engine fault detection is handled inside the engine ECM. Fault information is communicated via the SAE-J1939 data link for annunciation in the HMI.

Alternator Protection

AmpSentry protective relay - A comprehensive monitoring and control system integral to the PowerCommand® Control System that guards the electrical integrity of the alternator and power system by providing protection against a wide array of fault conditions in the genset or in the load. It also provides single and three phase fault current regulation (3x Current) so that downstream protective devices have the maximum current available to quickly clear fault conditions without subjecting the alternator to potentially catastrophic failure conditions. Thermal damage curve (3 phase short) or fixed timer (2sec for 1P short, 5sec for 2P short). See document R1053 for a full-size time over current curve. The control does not included protection required for interconnection to a utility (mains) service.



AmpSentry Maintenance Mode (AMM) - Instantaneous tripping, if AmpSentry Maintenance mode is active (50mS response to turn off AVR excitation/shutdown genset) for arc flash reduction when personnel are near genset.

High AC voltage shutdown (59) - Output voltage on any phase exceeds preset values. Time to trip is inversely proportional to amount above threshold. Values adjustable from 105-125% of nominal voltage, with time delay adjustable from 0.1-10 seconds. Default value is 110% for 10 seconds.

Low AC voltage shutdown (27) - Voltage on any phase has dropped below a preset value. Adjustable over a range of 50-95% of reference voltage, time delay 2-20 seconds. Default value is 85% for 10 seconds. Function tracks reference voltage. Control does not nuisance trip when voltage varies due to the control directing voltage to drop, such as during a V/Hz roll-off or synchronizing.

Under frequency shutdown (81 u) - Genset output frequency cannot be maintained. Settings are adjustable from 2-10 Hz below reference governor set point, for a 5-20 second time delay. Default: 6 Hz, 10 seconds. Under frequency protection is disabled when excitation is switched off, such as when engine is operating in idle speed mode.

Over frequency shutdown/warning (81o) - Genset is operating at a potentially damaging frequency level. Settings are adjustable from 2-10 Hz above nominal governor set point for a 1-20 second time delay. Default: 6 Hz, 20 seconds, disabled.

Overcurrent warning/shutdown (51) - Implementation of the thermal damage curve with instantaneous trip level calculated based on current transformer ratio and application power rating.

Loss of sensing voltage shutdown - Shutdown of genset will occur on loss of voltage sensing inputs to the control.

Field overload shutdown - Monitors field voltage to shutdown genset when a field overload condition occurs.

Over load (kW) warning - Provides a warning indication when engine is operating at a load level over a set point. Adjustment range: 80-140% of application rated kW, 0-120 second delay. Defaults: 105%, 60 seconds.

Reverse power shutdown (32) - Adjustment range: 5-20% of standby kW rating, delay 1-15 seconds. Default: 10%, 3 seconds.

Reverse Var shutdown (40) - Shutdown level is adjustable: 15-50% of rated Var output, delay 10-60 seconds. Default: 20%, 10 seconds.

Short circuit protection - Output current on any phase is more than 175% of rating and approaching the thermal damage point of the alternator. Control includes algorithms to protect alternator from repeated over current conditions over a short period of time.

Negative sequence overcurrent warning (46) – Control protects the generator from damage due to excessive imbalances in the three phase load currents and/or power factors.

Custom overcurrent warning/shutdown (51) – Control provides the ability to have a custom time overcurrent protection curve in addition to the AmpSentry protective relay function.

Ground fault overcurrent (51G) – Control detects a ground fault either by an external ground fault relay via a contact input or the control can measure the ground current from an external current transformer. Associated time delays and thresholds are adjustable via InPower or HMI.

Paralleling Protection

Breaker fail to close Warning: When the control signals a circuit breaker to close, it will monitor the breaker auxiliary contacts and verify that the breaker has closed. If the control does not sense a breaker closure within an adjustable time period after the close signal, the fail to close warning will be initiated.

Breaker fail to open warning: The control system monitors the operation of breakers that have been signaled to open. If the breaker does not open within and adjustable time delay, a Breaker Fail to Open warning is initiated.

Breaker position contact warning: The controller will monitor both 'a' and 'b' position contacts from the breaker. If the contacts disagree as to the breaker position, the breaker position contact warning will be initiated.

Breaker tripped warning: The control accepts inputs to monitor breaker trip / bell alarm contact and will initiate a breaker tripped warning if it should activate.

Fail to disconnect warning: In the controller is unable to open either breaker, a fail to disconnect warning is initiated. Typically, this would be mapped to a configurable output, allowing an external device to trip a breaker.

Fail to synchronize warning: Indicates that the genset could not be brought to synchronization with the bus. Configurable for adjustable time delay of 10 -900 seconds, 120 default.

Phase sequence sensing warning: Verifies that the genset phase sequence matches the bus prior to allowing the paralleling breaker to close.

Maximum parallel time warning (power transfer control mode only): During closed transition load transfers, control independently monitors paralleled time. If time is exceeded, warning is initiated and genset is disconnected.

Bus or genset PT input calibration warning: The control system monitors the sensed voltage from the bus and genset output voltage potential transformers. When the paralleling breaker is closed, it will indicate a warning condition if the read values are different.

Field Control Interface

Input signals to the PowerCommand® control include:

- Coolant level (where applicable)
- Fuel level (where applicable)
- Remote emergency stop
- Remote fault reset
- Remote start
- Rupture basin
- Start type signal
- Battle short
- Load demand stop
- Synchronize enable
- Genset circuit breaker inhibit
- Utility circuit breaker inhibit
- Single mode verify
- Transfer inhibit – prevent transfer to utility (in power transfer control mode)
- Retransfer inhibit – prevent retransfer to genset (in power transfer control mode)
- kW and kVAR load setpoints

Configurable inputs - Control includes (4) input signals from customer discrete devices that are configurable for warning, shutdown or status indication, as well as message displayed

Input signals for Lean Burn Natural Gas Engine applications:

- Gearbox oil pressure/temperature protection
- Fire fault
- Earth fault support as a discrete input via an appropriate secondary detection device
- Differential fault
- DC power supply fault
- Genset Interface Box (GIB) isolator open fault
- Start inhibit/enable (x3)
- Radiator fan trip
- Ventilator fan trip
- Ventilation louvers closed
- Start system trip
- Alternator heater trip
- Alternator heater status
- Alternator winding temperature (PT100 RTDx3)
- Alternator drive end bearing temperature (PT100 RTD)
- Alternator non-drive end bearing temperature (PT100 RTD)

Output signals from the PowerCommand® control include:

- Load dump signal: Operates when the genset is in an overload condition.
- Delayed off signal: Time delay-based output which will continue to remain active after the control has removed the run command. Adjustment range: 0 - 120 seconds. Default: 0 seconds.

- Configurable relay outputs: Control includes (4) relay output contacts (3 A, 30VDC). These outputs can be configured to activate on any control warning or shutdown fault as well as ready to load, not in auto, common alarm, common warning and common shutdown.
- Ready to load (genset running) signal: Operates when the genset has reached 90% of rated speed and voltage and latches until genset is switched to off or idle mode.
- Paralleling circuit breaker relays outputs: Control includes (4) relay output contacts (3.5A, 30 VDC) for opening and closing of the genset and utility breakers.

Output Signals for Lean Burn Natural Gas Engine applications:

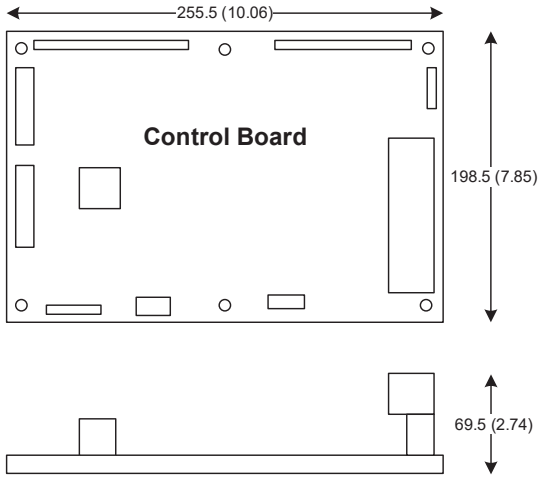
- Start inhibit/enable event
- Emergency stop event
- Ventilator fan run control
- Louvre control
- Radiator fan control
- Alternator heater control
- Engine at idle speed event

Communications connections include:

- PC tool interface: This RS-485 communication port allows the control to communicate with a personal computer running InPower software.
- Modbus RS-485 port: Allows the control to communicate with external devices such as PLCs using Modbus protocol.

  Note - An RS-232 or USB to RS-485 converter is required for communication between PC and control.
- Networking: This RS-485 communication port allows connection from the control to the other Cummins Power Generation products.

Mechanical Drawing



PowerCommand® Human Machine Interface HMI320

Description

This control system includes an intuitive operator interface panel that allows for complete genset control as well as system metering, fault annunciation, configuration and diagnostics. The interface includes five genset status LED lamps with both internationally accepted symbols and English text to comply with customer's needs. The interface also includes an LED backlit LCD display with tactile feel soft-switches for easy operation and screen navigation. It is configurable for units of measurement and has adjustable screen contrast and brightness.

The *run/off/auto* switch function is integrated into the interface panel.

All data on the control can be viewed by scrolling through screens with the navigation keys. The control displays the current active fault and a time-ordered history of the five previous faults.

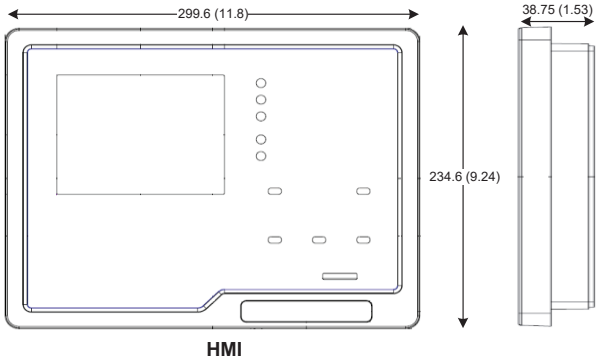
Features:

- LED indicating lamps
  - genset running
  - remote start
  - not in auto
  - shutdown
  - warning
  - auto
  - manual and stop
  - Circuit breaker open (if equipped)
  - Circuit breaker closed (if equipped)
- 320 x 240 pixels graphic LED backlight LCD.
- Four tactile feel membrane switches for LCD defined operation. The functions of these switches are defined dynamically on the LCD.
- Seven tactile feel membrane switches dedicated screen navigation buttons for up, down, left, right, ok, home and cancel.
- Six tactile feel membrane switches dedicated to control for auto, stop, manual, manual start, fault reset and lamp test/panel lamps.
- Two tactile feel membrane switches dedicated to control of circuit breaker (where applicable).
- Allows for complete genset control setup.
- Certifications: Suitable for use on gensets that are designed, manufactured, tested and certified to relevant UL, NFPA, ISO, IEC, Mil Std., UKCA and CE standards.
- Languages supported: English, Spanish, French, German, Italian, Greek, Portuguese, Finnish, Norwegian, Danish, Russian (Cyrillic), Chinese, Hungarian, Japanese, Polish, Korean, Romanian, Brazilian Portuguese, Turkish, Dutch, and Czech

Communications connections include:

- PC tool interface - This RS-485 communication port allows the HMI to communicate with a personal computer running InPower.
- This RS-485 communication port allows the HMI to communicate with the main control board.

Mechanical Drawing



HMI

Dimensions: mm (inches)

Software

InPower (beyond 6.5 version) is a PC-based software service tool that is designed to directly communicate to PowerCommand® gensets and transfer switches, to facilitate service and monitoring of these products.

Environment

The control is designed for proper operation without recalibration in ambient temperatures from -40 ºC (-40 ºF) to +70º C (158 ºF), and for storage from -55 ºC (-67 ºF) to +80 ºC (176 ºF). Control will operate with humidity up to 95%, non-condensing.

The HMI is designed for proper operation in ambient temperatures from -20 ºC (-4 ºF) to +70 ºC (158 ºF), and for storage from -30 ºC (-22 ºF) to +80 ºC (176 ºF).

The control board is fully encapsulated to provide superior resistance to dust and moisture. Display panel has a single membrane surface, which is impervious to effects of dust, moisture, oil and exhaust fumes. This panel uses a sealed membrane to provide long reliable service life in harsh environments.

The control system is specifically designed and tested for resistance to RFI/EMI and to resist effects of vibration to provide a long reliable life when mounted on a genset. The control includes transient voltage surge suppression to provide compliance to referenced standards.

Certifications

PowerCommand® meets or exceeds the requirements of the following codes and standards:

- NFPA 110 for level 1 and 2 systems.
- ISO 8528-4:2005 compliance, controls and switchgear (second edition)
- CE marking: The CE marking is only valid when equipment is used in a fixed installation application. Material compliance declaration is available upon request.
- UKCA marking- The UKCA marking is only valid when equipment is used in a fixed installation application. Material compliance declaration is available upon request.
- EN 50081-1,2 residential/light industrial emissions or industrial emissions.
- EN 50082-1,2 residential/light industrial or industrial susceptibility.
- ISO 7637-2, level 2; DC supply surge voltage test.
- Mil Std 202C, Method 101 and ASTM B117: Salt fog test.
- UL 6200 recognized, suitable for use on UL 2200 Listed generator sets.
- CSA C282-M1999 compliance
- CSA 22.2 No. 14 M91 industrial controls.
- PowerCommand® control systems and generator sets are designed and manufactured in ISO 9001 certified facilities.
- ROHS (Restriction of Hazardous substance) complaint both for HMI 320 & PCC3300v2.

Reference Documents

Please refer to the following reference documents available in the PowerSuite library:

- PowerCommand™ 3.3. Application Guide
- T-037: PowerCommand Control Application Manual (ANSI Protective Functions)
- T-040: PowerCommand 3.3 Paralleling Application Guide

Please refer to the following reference documents available on Cummins Quickserve:

- Service Manuals for PC3.3 (non-MLD) and PC3.3 (MLD)
- Modbus Register Mapping

Warranty

All components and subsystems are covered by an express limited one-year warranty. Other optional and extended factory warranties and local distributor maintenance agreements are available.

PCCNet COMPATIBLE

Specification Sheet

Enclosures and Tanks

250-1000 kW Gensets

Enclosure Standard Features

- 14-gauge steel construction (panels)
- Stainless steel hardware
- Zinc phosphate pretreatment, e-coat primer and super durable powder topcoat paint minimize corrosion and color fade
- Package listed to UL 2200
- Designed to satisfy national electrical code installation requirements
- Fuel and electrical stub-up area within enclosure perimeter
- Fixed louvers
- Cambered roof prevents water accumulation
- Recessed, lockable doors in two sides
- Retainers hold doors open for easy access
- Enclosed exhaust silencer ensures safety and protects against rust
- Rain cap
- Exterior oil and coolant drains with interior valves for ease of service
- Rodent barriers on inlet
- Non-hydroscopic sound attenuating material
- Side mounted controls and circuit breakers
- Easy access lifting points for spreader bars
- Dual vibration isolation system (250-500 kW)
- Spring vibration isolation system (600-1000 kW)
- Enclosure mounts to lifting base or fuel tank (250-500 kW)
- Enclosure mounts to lifting base (600-1000 kW)
- Factory pre-assembled package
- Designed for outdoor use only
- Externally mounted emergency stop button for operator safety (optional on 250-500 kW)
- Horizontal air discharge to prevent leaf and snow accumulation (600-1000 kW)

Options

- Three levels of sound attenuation
- Motorized louvers to protect from ice and snow accumulation (available on air inlet for all models and on air outlet on level II, 250-500 kW enclosures only)
- Horizontal air discharge, sound level 2 only (250-500 kW)
- Aluminium construction with roll-coated polymer paint
- Wind rated to 150 mph
- Neutral sandstone paint color
- Factory mounted battery charger
- External 120 VAC service outlet
- Rain hoods for air inlet (250-500 kW)
- Lifting base in lieu of a sub-base tank (250-500 kW)
  - Pre-wired AC distribution package
  - 100 amp (250-500 kW) or 150 amp (600-1000 kW) main circuit breaker; connected to 120 VAC Line-Neutral and 208 or 240 VAC Line-Line, spare breaker positions and capacity for future upgrades (600-1000 kW)
  - GFCI protected internal 120 VAC service receptacle
  - GFCI protected weather proof external 120 volt service receptacle
  - All factory installed AC powered features pre-wired into load center
- Interior lights – 120 volt (600-1000 kW)
- Rain hoods for air inlet (250-500 kW)
- Seismic isolators available (600-1000 kW)

Fuel Tanks

Standard sub-base tank features

- UL 142 Listed
- ULC-S601-07 Listed
- NFPA37 compliant
- Dual walled, steel construction
- Emergency tank and rupture basin vents
- Tank mounted mechanical fuel gauge
- Fuel supply and return tubes
- Top mounted leak detection float switch
- Low and high level fuel switches
- Mounting brackets for optional pump and control (250-500 kW)
- Integral lifting points

Sub-base tank options

- Pre-wired fuel pump and control
- Fuel overfill alarm – internal or external
- Overflow and tank fill plugs
- Five gallon spill fill box – internal or external
- Fill pipe extender
- Local code approvals available

200-500 kW Dual Wall Sub-base Fuel Tanks – usable operating hours

Genset model (60 Hz)	Gallons /hour at full load	270 gallon tank	300 gallon tank	400 gallon tank	500 gallon tank	600 gallon tank	660 gallon tank	720 gallon tank	850 gallon tank	1420 gallon tank	1470 gallon tank	1700 gallon tank	2050 gallon tank	2525 gallon tank
250 DQDAA	20	14	15	20	25	30	33	36		72	74		104	
275 DQDAB	21	13	14	19	24	29	31	34		66	70		96	
300 DQDAC	23	12	13	17	22	26	29	31		61	64		88	
300 DQHAB	23	12	13	17	22	26	29		37			74		
450 DFEJ	30	9	10	13	17	20	22		28			57		84
500 DFEK	34	8	9	11	15	18	19		25			50		74

Operating hours are measured at 60 Hz, standby rating.

600-1000 kW Dual Wall Sub-base Fuel Tanks – usable operating hours

Genset model	Gallons /hour at full load	200 gallon tank	660 gallon tank	1000 gallon tank	1500 gallon tank	2000 gallon tank	2400 gallon tank
600 DQCA	42	5	16	24	36	48	57
600 DQPAA	45	4	15	22	33	44	53
650 DQPAB	50	4	13	20	30	40	48
750 DQCB	51	4	13	20	29	39	47
750 DQFAA	53	4	12	19	28	38	45
800 DQCC	53	4	12	19	28	38	45
800 DQFAB	56	4	12	18	27	36	43
900 DQFAC	64	3	10	16	23	31	38
1000 DQFAD	72	3	9	14	21	28	33

*3000 gallon tank offered as an accessory kit – refer to NAAC-5853 spec sheet.

- Operating hours are measured at 60 Hz, standby rating.
- Up to 90% fill alarm to comply with NFPA30, operating capacity is reduced by 10%.

Enclosure Package Sound Pressure Levels @ 7 meters dB(A)

Genset model	Weather protective enclosure (F200, F203)	QuietSite level 1 sound attenuated enclosure (F201, F204)	QuietSite level 2 sound attenuated enclosure (F202, F205)
250 DQDAA	90	88	72
275 DQDAB	90	88	73
300 DQDAC	90	88	73
300 DQHAB	89	88	76
450 DFEJ	88	85	74
500 DFEK	89	87	73
600 DQCA	90.6/86*	79.3/78*	74.1/73*
600 DQPAA	89.10	80.70	74.70
650 DQPAB	89.70	81.40	75
750 DQCB	91.1/87*	79.9/79*	75.3/74*
750 DQFAA	87.8	77.8	73.8
800 DQCC	91.3/87*	80.2/79*	75.7/74*
800 DQFAB	88.1	78.3	74
900 DQFAC	88.8	79.1	74.6
1000 DQFAD	89.6	80.1	75.3

- All data is 60 Hz, full load standby rating, steel enclosures only.
- Data is a measured average of 8 positions.
- Sound levels for aluminium enclosures are approximately 2 dB(A) higher than listed sound levels for steel enclosures.

* Sound data with seismic feature codes L228-2 (IBC) and/or L225-2 (OSHPD)

Package Dimensions of Enclosure, Exhaust System, and UL Tank

250-500 kW

Tank size (gal)	Weather protective package length (in)	QuietSite level I package length (in)	QuietSite level 2 package length (in)	Width (in)	Height (in)	Weather protective package weight (lbs)	QuietSite level 1 package weight (lbs)	QuietSite level 2 package weight (lbs)
270	188	188	222	82	106	4991	5471	6711
300	188	188	222	82	104	5648	6073	6991
400	188	188	222	82	106	5833	6258	7176
500	188	188	222	82	108	5956	6381	7299
600	188	188	222	82	111	6116	6541	7459
660	188	188	222	82	113	6235	6660	7578
720	188	188	222	82	114	6174	6599	7517
850	188	188	222	82	118	6529	6954	7872
1420	200	200	222	82	128	6863	7343	8583
1470	192	192	222	82	128	7253	7733	8973
1700	234	234	234	82	128	7982	8407	9325
2050	284	284	284	82	128	8383	8863	10103
2525	346	346	346	82	128	9391	9871	11111
Lifting base	188	188	222	82	100	4335	4760	5678

600-1000 kW

Tank size (gal)	Weather protective package length (in)	QuietSite level I package length (in)	QuietSite level 2 package length (in)	Width (in)	Height (in)	Weather protective package weight (lbs)	QuietSite level 1 package weight (lbs)	QuietSite level 2 package weight (lbs)
200	260	303	315	98	137	10194	13074	14954
660	260	303	315	98	137	9586	12466	14346
1000	260	303	315	98	141	10117	12997	14877
1500	260	303	315	98	146	10677	13557	15437
2000	292	327	327	98	143	11959	14839	16719
2400	338	338	338	98	143	12961	15841	17721

- This weight does not include the generator set. Consult your local Cummins distributor or the appropriate generator specification sheet.
- Width is 86” lifting eye to lifting eye (250-500 kW), 102” lifting eye to lifting eye (600-1000 kW).
- Height - Florida, Michigan, and Suffolk add 6.4” (250-500 kW) or 2” (600-1000 kW) for bottom space.
- Maximum length emergency vent removed.

	CSA - The generator set is CSA certified to product class 4215-01.
	UL - The generator set is available listed to UL 2200, stationary engine generator assemblies. The PowerCommand® control is listed to UL 508 - Category NITW7 for U.S. and Canadian usage.

For more information contact your local Cummins distributor or visit power.cummins.com

Our energy working for you.™

S-1443 (11/18)

Sound data
500DFEK
60Hz Diesel

Sound pressure level @ 7 meters, dB(A)

See notes 1-8 listed below

Configuration		Measurement location number								Average
		1	2	3	4	5	6	7	8	
Standard – unhoused	Infinite exhaust	89	92	92	91	88	91	91	93	91
F183 – residential muffler	Mounted muffler	88	90	90	89	88	88	88	90	89
F200 – weather	Mounted muffler	91	90	85	88	89	88	85	91	89
F201 – quiet site II first stage	Mounted muffler	90	89	84	83	79	81	83	90	87
F202 – quiet site II second stage	Mounted muffler	71	73	71	72	73	74	74	73	73

Sound power level, dB(A)

See notes 2-6, 9, 10 listed below

Configuration		Octave band center frequency (Hz)								Overall sound power level
		63	125	250	500	1000	2000	4000	8000	
Standard – unhoused (note 3)	Infinite exhaust	82	98	104	109	112	113	111	113	119
F183 – residential muffler	Mounted muffler	105	114	115	111	108	108	102	101	119
F200 – weather	Mounted muffler	101	108	106	110	112	111	107	102	118
F201 – quiet site II first stage	Mounted muffler	101	108	105	108	111	109	106	99	116
F202 – quiet site II second stage	Mounted muffler	84	93	93	96	98	99	96	89	104

Exhaust sound power level, dB(A)

Open exhaust (no muffler) @ rated load	Octave band center frequency (Hz)								Overall sound power level
	63	125	250	500	1000	2000	4000	8000	
	103	119	125	123	125	126	127	121	133

Note:

1. Position 1 faces the engine front. The positions proceed around the generator set in a counter-clockwise direction in 45° increments. All positions are at 7 m (23 ft) from the surface of the generator set and 1.2 m (48 in.) from floor level.
2. Sound levels are subject to instrumentation, measurement, installation and manufacturing variability.
3. Sound data with remote-cooled generator sets are based on rated loads without cooling fan noise.
4. Sound levels for aluminum enclosures are approximately 2 dB(A)s higher than listed sound levels for steel enclosures.
5. Sound data for generator set with infinite exhaust do not include exhaust noise.
6. Data is based on full rated load with standard radiator-cooling fan package.
7. Sound pressure levels are measured per ANSI S1.13 and ANSI S12.18, as applicable.
8. Reference sound pressure is 20 µPa.
9. Sound power levels per ISO 3744 and ISO 8528-10, as applicable.
10. Reference power = 1 pw (10^{-12} W).
11. Exhaust sound power levels are per ISO 6798, as applicable.

Prototype Test Support (PTS)
60 Hz test summary

Generator set models	Representative prototype	
450DFEJ	Model:	500DFEK
500DFEK	Alternator:	HC5F
	Engine:	QSX15-G9

The following summarizes prototype testing conducted on the designated representative prototype of the specified models. This testing is conducted to verify the complete generator set electrical and mechanical design integrity. Prototype testing is conducted only on generator sets not sold as new equipment.

Maximum surge power: 516 kW

The generator set was evaluated to determine the stated maximum surge power.

Maximum motor starting: 2429 kVA

The generator set was tested to simulate motor starting by applying the specified kVA load at low lagging power factor (0.4 or lower). With this load applied, the generator set recovered to a minimum of 90% rated voltage.

Torsional analysis and testing:

The generator set was tested to verify that the design is not subjected to harmful torsional stresses in excess of 5000 psi. A spectrum analysis of the transducer output was conducted over the speed range of 1200 to 2000 RPM.

Cooling system: 50 °C ambient
0.50 in. H_2O restriction

The cooling system was tested to determine ambient temperature and static restriction capabilities. The test was performed at full rated load in elevated ambient temperature under static restriction conditions.

Durability:

The generator set was subjected to a minimum 500 hour endurance test operating at variable load up to the Standby rating based upon MIL-STD-705 to verify structural soundness and durability of the design.

Electrical and mechanical strength:

The generator set was tested to several single phase and three phase faults to verify that the generator can safely withstand the forces associated with short circuit conditions. The generator set was capable of producing full rated output at the conclusion of the testing.

Steady state performance:

The generator set was tested to verify steady state operating performance was within the specified maximum limits.

Voltage regulation:	± 0.5%
Random voltage variation:	± 0.3%
Frequency regulation:	Isochronous
Random frequency variation:	± 0.25%

Transient performance:

The generator set was tested with the standard alternator to verify single step loading capability as required by NFPA 110. Verify acceptable Voltage and frequency response on load addition or rejection were evaluated. The following results were recorded:

Full load acceptance:

Voltage dip:	30.1%
Recovery time:	3.6 seconds
Frequency dip:	9.9%
Recovery time:	3.8 seconds

Full load rejection:

Voltage rise:	12.8%
Recovery time:	3.8 seconds
Frequency rise:	3.2%
Recovery time:	1.5 seconds

Harmonic analysis:

(per MIL-STD-705B, method 601.4)

	Line to Line		Line to Neutral	
Harmonic	No load	Full load	No load	Full load
3	0.1	0.1	0.1	0.1
5	0.3	1.2	0.3	1.1
7	0.4	1.1	0.4	1.0
9	0.0	0.0	0.0	0.0
11	0.7	0.9	0.6	0.8
13	0.2	0.3	0.1	0.2
15	0.0	0.0	0.0	0.0

Cooling system data
500DFEK 60Hz

40 Degree C ambient radiator cooling system

Duty		Rating (kW)	Max cooling @ air flow static restriction, unhoused (inches water/mm water)						Housed in free air, no air discharge restriction			
			0.0/0.0	0.25/6.4	0.5/12.7	0.75/19.1	1.0/25.4		F183	F200	F201	F202
			Maximum allowable ambient temperature, degree C									
60 Hz	Standby	500	43	43	43	43	40	43	43	43	43	
	Prime	455	43	43	43	43	39	N/A	N/A	N/A	N/A	
50 Hz	Standby	440	43	43	43	43	43	N/A	N/A	N/A	N/A	
	Prime	400	43	43	43	43	43	N/A	N/A	N/A	N/A	

50 Degree C ambient radiator cooling system

Duty		Rating (kW)	Max cooling @ air flow static restriction, unhoused (inches water/mm water)					Housed in free air, no air discharge restriction			
			0.0/0.0	0.25/6.4	0.5/12.7	0.75/19.1	1.0/25.4	F183	F200	F201	F202
			Maximum allowable ambient temperature, degree C								
60 Hz	Standby	500	53	52	52	46	40	55	54	54	53
	Prime	455	53	52	52	43	39	N/A	N/A	N/A	N/A
50 Hz	Standby	440	55	55	55	55	54	N/A	N/A	N/A	N/A
	Prime	400	55	55	55	55	53	N/A	N/A	N/A	N/A

Notes:

1. Data shown are anticipated cooling performance for typical generator set.
2. Cooling data is based on 1000 ft (305 m) site test location.
3. Generator set power output may need to be reduced at high ambient conditions. Consult generator set data sheet for derate schedules.
4. Cooling performance may be reduced due to several factors including but not limited to: Incorrect installation, improper operation, fouling of the cooling system, and other site installation variables.

Exhaust Emission Data Sheet
500DFEK
60 Hz Diesel Generator Set
EPA NSPS Stationary Emergency

Engine Information:

Model:	Cummins Inc. QSX15-G9 NR 2	Bore:	5.39 in. (137 mm)
Nameplate BHP @ 1800 RPM:	755	Stroke:	6.65 in. (169 mm)
Type:	4 cycle, in-line, 6 cylinder diesel	Displacement:	912 cu. in. (14.9 liters)
Aspiration:	Turbocharged with air-to-air charge air cooling		
Compression Ratio:	17:1		
Emission Control Device:	Turbocharged with charge air-cooled		

Performance Data	1/4 Standby	1/2 Standby	3/4 Standby	Full Standby	Full Prime
Engine HP @ Stated Load (1800 RPM)	202	379	555	732	668
Fuel Consumption (gal/Hr)	11.3	18.7	25.8	34.7	30.6
Exhaust Gas Flow (CFM)	1400	2150	2730	3625	3160
Exhaust Gas Temperature (°F)	745	830	820	900	880
Exhaust Emission Data					
HC (Total Unburned Hydrocarbons)	0.24	0.09	0.07	0.14	0.12
NOx (Oxides of Nitrogen as NO_2)	3.24	3.65	4.64	4.43	4.04
CO (Carbon Monoxide)	0.57	0.34	0.40	0.39	0.36
PM (Particulate Matter)	0.09	0.05	0.05	0.02	0.02
Smoke (Pierburg)	0.52	0.44	0.42	0.21	0.20

All values (except smoke) are cited: g/BHP-hr

Test Methods and Conditions

Steady-state emissions recorded per ISO8178-1 during operation at rated engine speed (+/- 2%) and stated constant load (+/- 2%) with engine temperatures, pressures and emission rated stabilized.

Fuel specification:	40-48 Cetane Number, 0.05 Wt.% max. Sulfur; Reference ISO8178-5, 40CFR86.1313-98 Type 2-D and ASTM D975 No. 2-D.
Air Inlet Temperature:	25 °C (77 °F)
Fuel Inlet Temperature:	40 °C (104 °F)
Barometric Pressure:	100 kPa (29.53 in Hg)
Humidity:	10.7 g/kg (75 grains H_2O/lb) of dry air (required for NOx correction)
Intake Restriction:	Set to maximum allowable limit for clean filter
Exhaust Back Pressure:	Set to maximum allowable limit

Data was taken from a single engine test according to the test methods, fuel specification and reference conditions stated above and is subjected to instrumentation and engine-to-engine variability. Tests conducted with alternate test methods, instrumentation, fuel or reference conditions can yield different results.

2023 EPA Tier 2 Exhaust Emission Compliance Statement 500DFEK Stationary Emergency

60 Hz Diesel Generator Set

Compliance Information:

The engine used in this generator set complies with Tier 2 emissions limit of U.S. EPA New Source Performance Standards for stationary emergency engines under the provisions of 40 CFR 60 Subpart IIII.

Engine Manufacturer:	Cummins Inc.
EPA Certificate Number:	PCEXL015.AAJ-055
Effective Date:	10/06/2022
Date Issued:	10/06/2022
EPA Engine Family (Cummins Emissions Family):	PCEXL015.AAJ

Engine Information:

Model:	QSX/QSX15/QSX15-G/QSX15-G9	Bore:	5.39 in. (137 mm)
Engine Nameplate HP:	755	Stroke:	6.65 in. (169 mm)
Type:	4 Cycle, In-line, 6 Cylinder Diesel	Displacement:	912 cu. in. (15 liters)
Aspiration:	Turbocharged and CAC	Compression ratio:	17.0:1
Emission Control Device:	Electronic Control	Exhaust stack diameter:	8 in. (203 mm)

Diesel Fuel Emission Limits

D2 Cycle Exhaust Emissions

	Grams per BHP-hr			Grams per kWm-hr		
	NO_X + NMHC	CO	PM	NO_X + NMHC	CO	PM
EPA Emissions Limit	4.8	2.6	0.15	6.4	3.5	0.20

Test methods: EPA emissions recorded per 40 CFR Part 60, 89, 1039, 1065 and weighted at load points prescribed in the regulations for constant speed engines.

Diesel fuel specifications: Cetane number: 40-50, Reference: ASTM D975 No. 2-D, 300-500 ppm Sulfur

Reference conditions: Air Inlet Temperature: 25 °C (77 °F), Fuel Inlet Temperature: 40 °C (104 °F). Barometric Pressure: 100 kPa (29.53 in Hg), Humidity: 10.7 g/kg (75 grains H2O/lb) of dry air; required for NOx correction, Restrictions: Intake Restriction set to a maximum allowable limit for clean filter; Exhaust Back Pressure set to a maximum allowable limit..

Tests conducted using alternate test methods, instrumentation, fuel or reference conditions can yield different results. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.

Alternator data sheet

Frame size: HC5F

Characteristics

Weights:	Wound stator assembly:	1776 lb	800 kg
	Rotor assembly:	1512 lb	681 kg
	Complete assembly:	3738 lb	1684 kg
Maximum speed:		2250 rpm	
Excitation current:	Full load:	1.72 Amps	
	No load:	0.40 Amps	
Insulation system:	Class H throughout		

3 Ø Ratings (0.8 power factor)		**60 Hz** (winding no)				**50 Hz** (winding no)		
(Based on specific temperature rise at 40° C ambient temperature)		110/190 220/380 (311/312)	120/208 240/416 (311/312)	139/240 277/480 (311/312)	347/600 (07/17)	110/190 220/380 (311/312)	120/208 240/415 (311/312)	127/220 254/440 (311/312)
150° C rise ratings	kW	570	625	700	700	568	568	552
	kVA	713	781	875	875	710	710	690
125° C rise ratings	kW	538	590	660	660	536	536	520
	kVA	673	738	825	825	670	670	650
105° C rise ratings	kW	500	550	600	600	496	496	480
	kVA	625	688	750	750	620	620	600
80° C rise ratings	kW	440	484	528	528	432	432	416
	kVA	550	605	660	660	540	540	520

Reactances (per unit ± 10%)	110/190 220/380	120/208 240/416	139/240 277/480	347/600	110/190 220/380	120/208 240/415	127/220 254/440
(Based on full load at 125° C rise rating)							
Synchronous	3.64	3.33	2.80	2.80	2.90	2.43	2.10
Transient	0.17	0.15	0.13	0.13	0.17	0.14	0.12
Subtransient	0.12	0.11	0.09	0.09	0.11	0.09	0.08
Negative sequence	0.23	0.21	0.18	0.18	0.18	0.15	0.13
Zero sequence	0.10	0.09	0.08	0.08	0.08	0.07	0.06

Motor starting	Broad range	600	Broad range
Maximum kVA (90% sustained voltage)	2429	2429	1769

Time constants (sec)	Broad range	600	Broad range
Transient	0.080	0.080	0.080
Subtransient	0.012	0.012	0.012
Open circuit	2.500	2.500	2.500
DC	0.019	0.019	0.019

Windings (@ 20° C)	Broad range	600	Broad range
Stator resistance (Ohms per phase)	0.0062	0.0098	0.0062
Rotor resistance (Ohms)	2.1600	2.1600	2.1600
Number of leads	12	6	12

Single phase power can be taken up to 40% of 3 phase- ratings

VMC GROUP
THE POWER OF TOGETHER™

CERTIFICATE OF COMPLIANCE
SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS

Certification No.

VMA-50957-01C (Revision 10)

Expiration Date: 6/30/2023

Certification Parameters:

The nonstructural products (mechanical and/or electrical components) listed on this certificate are CERTIFIED[1] FOR SEISMIC APPLICATIONS in accordance with the following building code[2] releases.

IBC 2015, 2012, 2009, 2006

The following model designations, options, and accessories are included in this certification. Reference report number VMA-50957-01 as issued by The VMC Group for a complete list of certified models, included accessories/options, and certified installation methods.

Cummins Power Generation, Inc.; Diesel Gensets

DSGAA-E, DSHAD, DQDAA-C, DQHAA-B, DFEJ-K; 100kW - 500kW

The above referenced equipment is **APPROVED** for seismic application when properly installed[3], used as intended, and contains a Seismic Certification Label referencing this Certificate of Compliance[4]. As limited by the tabulated values, below grade, grade, and roof-level installations, installations in essential facilities, for life safety applications, and/or of equipment containing hazardous contents are permitted and included in this certification with an Equipment Importance Factor assigned as I_p=1.5. The equipment is qualified by successful seismic shake table testing at the nationally recognized University of California Berkeley Pacific Earthquake Engineering Research Center under the review of the ISO Accredited Product Certification Agency, the VMC Group.

Certified Seismic Design Levels			
Certified **IBC**	**Importance $I_p \leq 1.5$** Soil Classes A-E Risk Categories I-IV Design Categories A-F	z/h ≤ 1.0	z/h = 0.0
		$S_{DS} \leq 0.647$ g	$S_{DS} \leq 1.940$ g

Certified Seismic Installation Methods[8]	
External Isolation Mounting From Unit Base To Fuel Tank	External Isolation Mounting From Unit Base To Rigid Structure
Rigid Mounting From Unit Base To Fuel Tank	Rigid Mounting From Unit Base To Rigid Structure

HEADQUARTERS
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Houston, TX 77041
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Fax: 713.466.1355

thevmcgroup.com

VMC GROUP
THE POWER OF TOGETHER™

CERTIFICATE OF COMPLIANCE

SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS

Certified Product Table:

Series	Model	Max Rating [kW]	Length [in]	Width [in]	Height [in]	S_{DS} @ z/h=0	S_{DS} @ z/h=1	Tank Range [gal]	Enclosure[1]	Mounting Configurations
DFEx (QSX15)	J, K	450, 500	366	86	128	1.94	0.64	270-2525	F183, F200-F205	Rigid Mounting From Unit Base To Rigid Structure / Fuel Tank External Isolation Mounting From Unit Base to Rigid Structure/ Fuel Tank
DQDAx (QSL9-G7)	A, B, C	250, 275, 300	266	90	134	2.48	2.00	270-2050		
DQHAx (QSM11)	A, B	275, 300	226	80	128	2.28	2.28	270-1700		
DSHAx (QSL9-G2)	D	230	143	42	110			282-1296	F172-173, F182, F216-217	
DSGAx (QSB7)	A, B, C, D, E	100, 125, 150, 175, 200	184	44	114	2.48	2.00	309-1140	F173, F182, F216-217, F232-233	Rigid Mounting From Unit Base To Rigid Structure / Fuel Tank

[1]Note: The F201, F202, F204, & F205 are certified in the tested mineral wool foam configuration, as well as the analyzed PU foam configuration highlighted in the FEA section of Certification Report VMA-50957-01

Group	Type	S_{DS} (z/h=0)	S_{DS} (z/h=1)	A_{Flex-H}	A_{Rig-H}	A_{Flex-V}	A_{Rig-V}	Rigid Mounting F_p/W_p	Isolated Mounting F_p/W_p
Seismic	AC156	1.940	0.647	1.94	0.776	1.293	0.518	0.466	1.455

This certification includes the open generator set and the enclosed generator set when installed with or without the sub-base tank. The generator set and included options shall be a catalogue design and factory supplied. The generator set and applicable options shall be installed and attached to the building structure per the manufacturer supplied seismic installation instructions. This certification excludes After Treatment Units (ATUs), all non-factory supplied accessories, including but not limited to mufflers, isolation/restraint devices, remote control panels, remote radiators, pumps and other electrical/mechanical components.

IBC CERTIFIED VMC GROUP

VMA-50957-01C (Revision 10)
Issue Date: Thursday, March 2, 2017
Revision Date: Monday, January 25, 2021
Expiration Date: Friday, June 30, 2023

VMC GROUP
THE POWER OF TOGETHER™

CERTIFICATE OF COMPLIANCE

SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS

Notes & Comments:

1. All equipment listed herein successfully passed the seismic acceptance criteria for shake testing non-structural components and systems as set forth in the ICC AC-156. The Test Response Spectrum (TRS) enveloped the Required Response Spectrum (RRS) for all units tested. The tested units were representative sample(s) of a contingent of models and all remained captive and structurally sound after the seismic shake simulation. The units also remained functionally operational after the simulation testing as functional testing was completed by the equipment manufacturer before and after the seismic simulations. Although a seismic qualified unit inherently contains some wind resisting capacity, that capacity is undetermined and is excluded from this certification. Snow/Ice loads have been neglected and thus limit the unit to be installed both indoors (covered by an independent protective structure) and out of doors (exposed to accumulating snow/ice) for ground snow loads no greater than 30 psf for all applications.

2. The following building codes are addressed under this certification:
   IBC 2015 referencing ASCE7-10 and ICC-ES AC-156
   IBC 2012 referencing ASCE7-10 and ICC-ES AC-156
   IBC 2009 referencing ASCE7-05 and ICC-ES AC-156
   IBC 2006 referencing ASCE7-05 and ICC-ES AC-156

3. Refer to the manufacturer supplied installation drawings for anchor requirements and mounting considerations for seismic applications. Required anchor locations, size, style, and load capacities (tension and shear) may be specified on the installation drawings or specified by a 3rd party. Mounting requirement details such as anchor brand, type, embedment depth, edge spacing, anchor-to-anchor spacing, concrete strength, special inspection, wall design, and attachment to non-building structures must be outlined and approved by the Engineer of Record for the project or building. Structural walls, structural floors, and housekeeping pads must also be seismically designed and approved by the project or building Structural Engineer of Record to withstand the seismic anchor loads as defined on the installation drawings. The installing contractor is responsible for ensuring the proper installation of all anchors and mounting hardware.

4. For this certificate and certification to remain valid, this certificate must correspond to the "Seismic Certification Label" found affixed to the unit by the factory. The label ensures the manufacturer built the unit in conformance to the IBC seismic design criteria set forth by the Certified Seismic Qualification Agency, the VMC Group, and meets the seismic design levels claimed by this certificate.

5. Mechanical, Electrical, and Plumbing connections to the equipment must be flexibly attached as to not transfer load through the connection. The structural integrity of any conduit, cable trays, piping, ductwork and/or flexible connections is the responsibility of others. This certification does not guarantee the equipment will remain compliant to NEMA, IP, UL, or CSA standards after a seismic event.

6. This certificate applies to units manufactured at:
   Cummins Power Generation, Inc., 1400 73rd Ave NE, Minneapolis, MN 55432

7. This certification follows the VMC Group's ISO-17065 Scheme.

8. The certified seismic installation methods states are a summary for all series this certificate covers, for more detailed information on the certified seismic installation methods, see the certified product tables.

John P. Giuliano, PE
President, VMC Group

IAS ACCREDITED Product Certification Agency

VMA-50957-01C (Revision 10)
Issue Date: Thursday, March 2, 2017
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IBC CERTIFIED VMC GROUP

PTC® Creo® Parametric

SEISMIC INSTALLATIONS NOTES:

1. THE DESIGN OF POST-INSTALLED ANCHORS IN CONCRETE USED FOR THE COMPONENT ANCHORAGE IS PRE-QUALIFIED FOR SEISMIC APPLICATIONS IN ACCORDANCE WITH "ACI 355.2" AND DOCUMENTED IN A REPORT BY A REPUTABLE TESTING AGENCY. (EX. THE EVALUATION SERVICE REPORT ISSUED BY THE INTERNATIONAL CODE COUNCIL)

2. THE INSTALLATION GUIDELINES IN THIS DRAWING ARE RECOMMENDATIONS FROM THE ISOLATOR SUPPLIER AND SHOULD BE CONTACTED IF IN DOUBT.

3. ANCHORS MUST BE INSTALLED IN MINIMUM 4000 PSI COMPRESSIVE STRENGTH NORMAL WEIGHT CONCRETE EXCEPT WHERE OTHERWISE INDICATED. CONCRETE AGGREGATE MUST COMPLY WITH "ASTM C33". INSTALLATION IN STRUCTURAL LIGHTWEIGHT CONCRETE IS NOT PERMITTED UNLESS OTHERWISE APPROVED BY THE STRUCTURAL ENGINEER OF RECORD.

4. ANCHORS MUST BE INSTALLED TO THE TORQUE SPECIFICATION AS RECOMMENDED BY THE ANCHOR MANUFACTURER TO OBTAIN MAXIMUM LOADING.

5. ANCHORS MUST BE INSTALLED IN LOCATIONS SPECIFIED ON THIS INSTALLATION DRAWING.

6. WIDE WASHERS MUST BE INSTALLED AT EACH ANCHOR LOCATION BETWEEN THE ANCHOR HEAD AND EQUIPMENT FOR TENSION LOAD DISTRIBUTION. WIDE WASHERS MUST BE SERIES "W" OF AMERICAN NATIONAL STANDARD TYPE "A" PLAIN WASHERS (ANSI B18.22.1-1965, R1975) WITH THE NOMINAL WASHER SIZE SELECTED TO MATCH THE SPECIFIED NOMINAL ANCHOR DIAMETER.

7. CONCRETE FLOOR SLAB AND CONCRETE HOUSEKEEPING PADS MUST BE DESIGNED AND REBAR REINFORCED FOR SEISMIC APPLICATIONS IN ACCORDANCE WITH "ACI 318".

8. EQUIPMENT ANCHORAGE MUST BE INSTALLED PER THE MANUFACTURER'S INSTRUCTIONS.

9. ALL HOUSEKEEPING PADS MUST BE DOWELLED OR CAST INTO THE BUILDING STRUCTURAL FLOOR SLAB AND DESIGNED FOR SEISMIC APPLICATION PER "ACI 318" AND AS APPROVED BY THE STRUCTURAL ENGINEER OF RECORD.

10. ALL ACCESSORY ATTACHMENTS (PIPE, CONDUIT, ETC.) TO THE EQUIPMENT SHALL BE ATTACHED IN A MANNER THAT ALLOWS RELATIVE MOTION (FLEX, SWING, JOIN/ELBOW, ETC.) TO PREVENT FAILURE DUE TO DIFFERENTIAL MOVEMENT BETWEEN THE EQUIPMENT AND ATTACHED ACCESSORY CAUSED BY SEISMIC LOADING ON THE SYSTEM.

11. FLOOR MOUNTED EQUIPMENT (WITH OR WITHOUT A HOUSEKEEPING PAD) MUST BE INSTALLED TO A REBAR REINFORCED STRUCTURAL CONCRETE FLOOR THAT IS SEISMICALLY DESIGNED AND APPROVED BY THE ENGINEER OF RECORD TO RESIST THE ADDED SEISMIC LOADS FROM COMPONENTS BEING ANCHORED TO THE FLOOR.

12. WHEN INSTALLING TO A FLOOR, REBAR INTERFERENCE MUST BE CONSIDERED.

13. ATTACHING SEISMIC CERTIFIED EQUIPMENT TO ANY FLOOR OR WALL OTHER THAN THOSE CONSTRUCTED OF STRUCTURAL CONCRETE AND DESIGNED TO ACCEPT THE SEISMIC LOADS FROM SAID EQUIPMENT IS NOT PERMITTED BY THIS SPECIFICATION AND BEYOND THE SCOPE OF THIS CERTIFICATION.

14. ATTACHING SEISMIC CERTIFIED EQUIPMENT TO ANY FLOOR CONSTRUCTED OF LIGHT WEIGHT CONCRETE OVER STEEL DECKING IS NOT PERMITTED BY THIS SPECIFICATION AND BEYOND THE SCOPE OF THIS CERTIFICATION.

15. ATTACHING SEISMIC CERTIFIED EQUIPMENT TO ANY CONCRETE BLOCK WALLS OR CINDER BLOCK WALLS IS NOT PERMITTED BY THIS SPECIFICATION AND BEYOND THE SCOPE OF THIS CERTIFICATION.

16. INSTALLATION UPON ANY STEEL DUNNAGE SHALL BE COORDINATED WITH THE STRUCTURAL ENGINEER OF RECORD. STEEL DUNNAGE MUST BE CERTIFIED BY OTHERS AS IS BEYOND THE SCOPE OF THIS REPORT.

17. INSTALLATION UPON ANY ROOFTOP CURB SHALL BE COORDINATED WITH THE CURB MANUFACTURER AND THE STRUCTURAL ENGINEER OF RECORD. ANY CURB OR CONCRETE PAD THAT SUPPORTS THE GENSET UNIT IS BEYOND THE SCOPE OF THIS CERTIFICATION.

18. NOTE REMOVED

REL NO	LTR	NO	REVISION	DWN	CKD	APVD	DATE
ECO-172465	G	1	UPDATED TABLES	MI	CF	M.WINGFIELD	25SEP17
		2	ZONE D6, NOTE 2 WAS "ANCHORS MUST BE ...THE ANCHOR DIAMETER.	MI	CF	M.WINGFIELD	25SEP17
		3	ZONE D6, ADD "EXCEPT WHERE OTHERWISE INDICATED."TO NOTE 3	MI	CF	M.WINGFIELD	25SEP17
		4	ZONE C6, RMV'D "THE DESIGN LOADS... CUMMINS INSTALLATION DRAWING." FROM NOTE 7	MI	CF	M.WINGFIELD	25SEP17
		5	ZONE C6, NOTE 8 WAS "ALL HOUSEKEEPING PAD...WHICHEVER IS LARGEST."	MI	CF	M.WINGFIELD	25SEP17
		6	ZONE C6, NOTE 10 WAS "WALL MOUNTED EQUIPMENT...TO THE WALL."	MI	CF	M.WINGFIELD	25SEP17
		7	ZONE B6, RMV "OR WALL" FROM NOTE 12	MI	CF	M.WINGFIELD	25SEP17
		8	ZONE B6, RMV "UNFILLED" FROM NOTE 15	MI	CF	M.WINGFIELD	25SEP17
		9	ZONE B6, NOTE 16 WAS "INSTALLATION UPON A...ENGINEER OF RECORD."	MI	CF	M.WINGFIELD	25SEP17
		10	ZONE B6, REMOVED NOTE 18	MI	CF	M.WINGFIELD	25SEP17
		11	ADD SHEET 5	MI	CF	M.WINGFIELD	25SEP17
		12	ADD SHEET 6	MI	CF	M.WINGFIELD	25SEP17
		13	ADD SHEET 7	MI	CF	M.WINGFIELD	25SEP17
		14	SEE SHEET 2	MI	CF	M.WINGFIELD	25SEP17
		15	SEE SHEET 2	MI	CF	M.WINGFIELD	25SEP17
		16	SEE SHEET 2	MI	CF	M.WINGFIELD	25SEP17
		17	SEE SHEET 2	MI	CF	M.WINGFIELD	25SEP17
		18	SEE SHEET 2	MI	CF	M.WINGFIELD	25SEP17
		19	SEE SHEET 3	MI	CF	M.WINGFIELD	25SEP17
		20	SEE SHEET 3	MI	CF	M.WINGFIELD	25SEP17
		21	SEE SHEET 4	MI	CF	M.WINGFIELD	25SEP17
		22	SEE SHEET 4	MI	CF	M.WINGFIELD	25SEP17
		23	SEE SHEET 4	MI	CF	M.WINGFIELD	25SEP17
		24	SEE SHEET 4	MI	CF	M.WINGFIELD	25SEP17
		25	SEE SHEET 4	MI	CF	M.WINGFIELD	25SEP17
		26	SEE SHEET 4	MI	CF	M.WINGFIELD	25SEP17
		27	RMV C11 LABEL	MI	CF	M.WINGFIELD	25SEP17

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS
DIM: X ±1; .X ±0.8; .XX± 0.38
HOLE: 0.00- 4.99 +0.15/-0.08; 5.00- 9.99 +0.20/-0.10; 10.00-17.49 +0.25/-0.13; 17.50-24.99 +0.30/-0.13
ANG TOL: ± 1.0° SCALE: 1/1

SIM TO A030B114
DO NOT SCALE PRINT
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DWN L WRIGHT
CKD Z MOGES
APVD Z MOGES
DATE 10MAR10
FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ASME Y14.5M-1994. FIRST USED ON DQDAA

SITE CODE PGF

CUMMINS POWER GENERATION
INSTALLATION, GENSET
SEISMIC REQUIREMENTS
DWG SIZE D A030W791 SHEET 1 OF 7 DWG REV G

Regulatory Review and Approval is required prior to changing this item per PGG 1-01-01-116. This item impacts compliance with these External Regulations: IBC

Drawing Name: A030W792 Revision: G
Part Name: A030W791 Revision: G
ECO-172465 Sheet 1 of 8

PTC® Creo® Parametric

REL NO	LTR	NO	REVISION	DWN	CKD	APVD	DATE
ECO-172465	G	1	UPDATED TABLES	MI	CF	M.WINGFIELD	25SEP17
		19	ZONE C-5, C-4: 1.94 WAS 2.48				
		20	ZONE B-5, B-4: 0.64 WAS 2.00				

RIGID MOUNTED GENERATOR SETS: GROUND LEVEL INSTALLATIONS

CUMMINS GENSET MODEL	CONFIGURATION	ATTACHMENT TO STEEL		ATTACHMENT TO CONCRETE					
		SEISMIC LEVEL	ISOLATOR ATTACHMENT TO STEEL	SEISMIC LEVEL	ISOLATOR ATTACHMENT TO CONCRETE	ANCHOR EMBEDMENT	MINIMUM EDGE DISTANCE (FROM ANCHOR LOCATION)	CONCRETE COMPRESSIVE STRENGTH	SLAB THICKNESS
DFEJ/K	OPEN OR WITH F183 ENCLOSURE	SDS=1.94 Z/H=0.0	(6) TOTAL Ø3/4" ASTM A307 BOLTS	SDS=1.94 Z/H=0.0	(6) TOTAL KWIK BOLT TZ-CS 3/4	4.75" MIN.	6.0"	4000 PSI MIN.	8.0" MIN.
	OPEN LIFT BASE MOUNTED GENSET		(8) TOTAL Ø3/4" ASTM A307 BOLTS		(8) TOTAL KWIK BOLT TZ-CS 3/4				
	OPEN SUB-BASE FUEL TANK (270-850 GAL)		(12) TOTAL Ø3/4" GRADE 2/ASTM A307 BOLTS		(12) TOTAL KWIK BOLT TZ-CS 3/4		8.0"		9.0" MIN
	OPEN SUB-BASE FUEL TANK (1700 GAL)		(16) TOTAL Ø3/4" GRADE 2/ASTM A307 BOLTS		(16) TOTAL KWIK BOLT TZ-CS 3/4				8.0" MIN.
	OPEN SUB-BASE FUEL TANK (2525 GAL)		(14) TOTAL Ø3/4" GRADE 2/ASTM A307 BOLTS		(14) TOTAL HIT-RE 500 V3 + HIS-N B7 3/4	8.0" MIN.	10.0"		12.0" MIN.
	THOR LIFT BASE MOUNTED GENSET		(8) TOTAL Ø3/4" ASTM A307 BOLTS		(8) TOTAL KWIK BOLT TZ-SS-304 3/4"	4.75" MIN.	7.0"		8.0" MIN.
	THOR LIFT BASE MOUNTED GENSET with fuel tank 270-850 GAL		(12) TOTAL Ø3/4" GRADE 2/ASTM A307 BOLTS		(12) TOTAL HIT-RE 500 V3 + HIS-N B7 3/4"	8.0" MIN.	10.0"		10.0" MIN.
	THOR LIFT BASE MOUNTED GENSET with fuel tank 1700 GAL		(16) TOTAL Ø3/4" GRADE 2/ASTM A307 BOLTS		(16) TOTAL HIT-RE 500 V3 + HIS-N B7 3/4		9.0"		12.0" MIN.
	THOR LIFT BASE MOUNTED GENSET with fuel tank 2525 GAL		(14) TOTAL Ø3/4" GRADE 2/ASTM A307 BOLTS		(14) TOTAL HIT-RE 500 V3 + HAS B7 3/4	8.15" MIN.	14.0"		16.0" MIN.

RIGID MOUNTED GENERATOR SETS: ROOF LEVEL INSTALLATIONS

CUMMINS GENSET MODEL	CONFIGURATION	ATTACHMENT TO STEEL		ATTACHMENT TO CONCRETE					
		SEISMIC LEVEL	SKID/TANK ATTACHMENT TO STEEL	SEISMIC LEVEL	SKID/TANK ATTACHMENT TO CONCRETE	ANCHOR EMBEDMENT	MINIMUM EDGE DISTANCE (FROM ANCHOR LOCATION)	CONCRETE COMPRESSIVE STRENGTH	SLAB THICKNESS
DFEJ/K	OPEN OR WITH F183 ENCLOSURE	SDS=0.64 Z/H=1.0	(6) TOTAL Ø3/4" ASTM A307 BOLTS	SDS=0.64 Z/H=1.0	(6) TOTAL KWIK BOLT TZ-CS 3/4	4.75" MIN.	6.0"	4000 PSI MIN.	8.0" MIN.
	OPEN LIFT BASE MOUNTED GENSET		(8) TOTAL Ø3/4" ASTM A307 BOLTS		(8) TOTAL KWIK BOLT TZ-CS 3/4				
	OPEN SUB-BASE FUEL TANK (270-850 GAL)		(12) TOTAL Ø3/4" GRADE 2/ASTM A307 BOLTS		(12) TOTAL KWIK BOLT TZ-CS 3/4		8.0"		9.0" MIN
	OPEN SUB-BASE FUEL TANK (1700 GAL)		(16) TOTAL Ø3/4" GRADE 2/ASTM A307 BOLTS		(16) TOTAL KWIK BOLT TZ-CS 3/4				8.0" MIN.
	OPEN SUB-BASE FUEL TANK (2525 GAL)		(14) TOTAL Ø3/4" GRADE 2/ASTM A307 BOLTS		(14) TOTAL HIT-RE 500 V3 + HIS-N B7 3/4	8.0" MIN.	10.0"		12.0" MIN.
	THOR LIFT BASE MOUNTED GENSET		(8) TOTAL Ø3/4" ASTM A307 BOLTS		(8) TOTAL KWIK BOLT TZ-SS-304 3/4"	4.75" MIN.	7.0"		8.0" MIN.
	THOR LIFT BASE MOUNTED GENSET with fuel tank 270-850 GAL		(12) TOTAL Ø3/4" GRADE 2/ASTM A307 BOLTS		(12) TOTAL HIT-RE 500 V3 + HIS-N B7 3/4"	8.0" MIN.	10.0"		10.0" MIN.
	THOR LIFT BASE MOUNTED GENSET with fuel tank 1700 GAL		(16) TOTAL Ø3/4" GRADE 2/ASTM A307 BOLTS		(16) TOTAL HIT-RE 500 V3 + HIS-N B7 3/4		9.0"		12.0" MIN.
	THOR LIFT BASE MOUNTED GENSET with fuel tank 2525 GAL		(14) TOTAL Ø3/4" GRADE 2/ASTM A307 BOLTS		(14) TOTAL HIT-RE 500 V3 + HAS B7 3/4	8.15" MIN.	14.0"		16.0" MIN.

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS
DIM: X ±1; .X ±0.8; .XX± 0.38
HOLE: 0.00- 4.99 +0.15/-0.08; 5.00- 9.99 +0.20/-0.10; 10.00-17.49 +0.25/-0.13; 17.50-24.99 +0.30/-0.13
ANG TOL: ± 1.0° SCALE: 1/1

SIM TO A030B114
DO NOT SCALE PRINT
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DWN L WRIGHT
CKD Z MOGES
APVD Z MOGES
DATE 10MAR10
FOR INTERPRETATION OF DIMENSIONS AND TOLERANCING, REF. ASME Y14.5M-1994
FIRST USED ON DQDAA

SITE CODE PGF

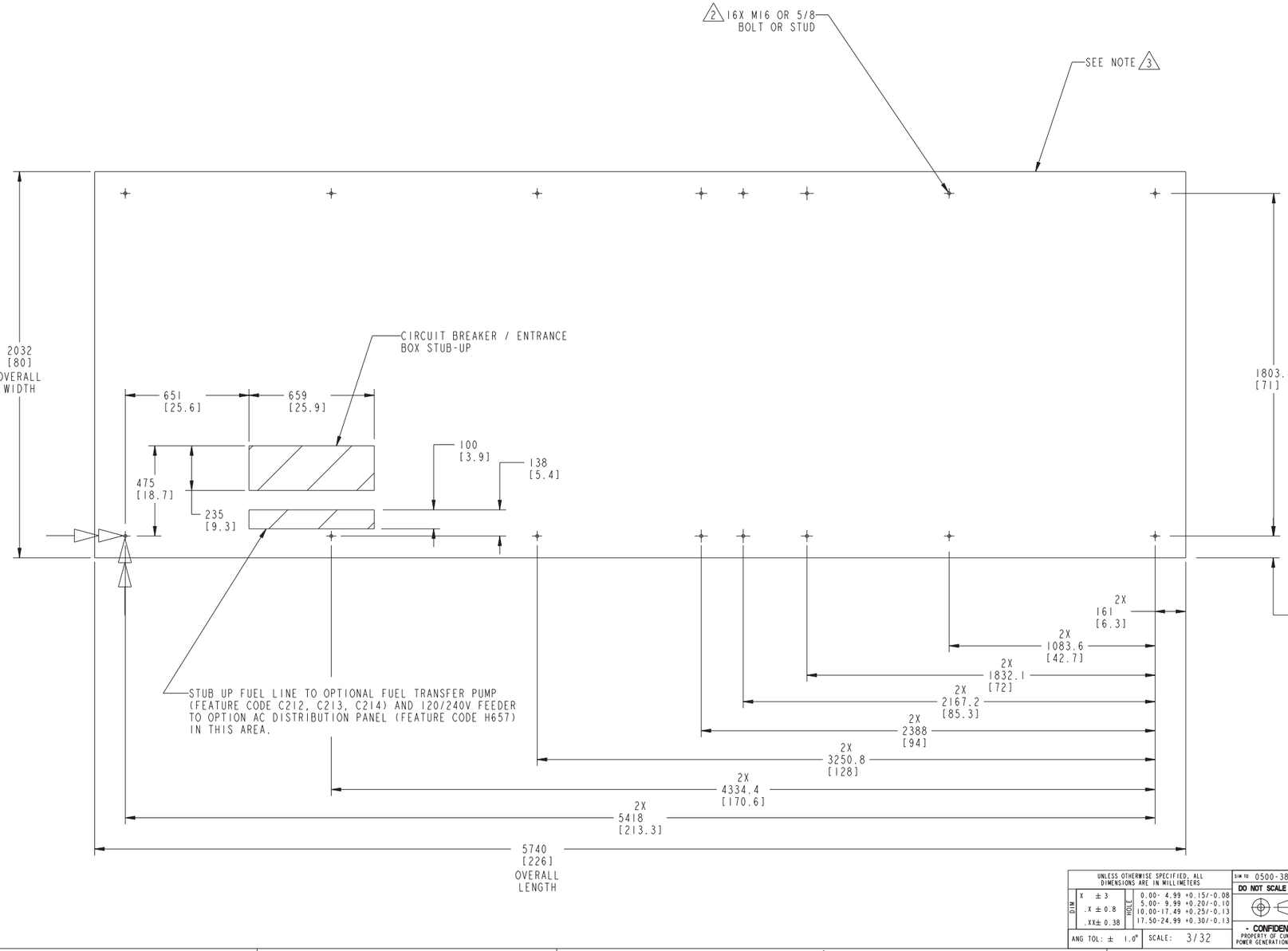
CUMMINS POWER GENERATION
INSTALLATION, GENSET
SEISMIC REQUIREMENTS
DWG SIZE D A030W791 SHEET 3 OF 7 DWG REV G

Regulatory Review and Approval is required prior to changing this item per PGG 1-01-01-116. This item impacts compliance with these External Regulations: IBC

Pro/ENGINEER

REL NO	LTR	NO	REVISION	DRN	CKD	APVD	DATE
ECO-114210	A	1	PRODUCTION_RELEASE	MRJ	ZYM	Z_MOGES	11JAN11

DFEG, DFEH, DFEJ, DFEK
DQHAA, DQHAB
(C209)



NOTE:

1. DIMENSIONS IN [ ] ARE IN INCHES.

2. SKID-BASE (LIFTING) AND FUEL TANK HAVE A FLANGE THICKNESS OF 4.76mm [.19 INCHES], (FLORIDA UNITS WITH FEATURE CODE L116) 8.76mm [.35 INCHES].} ALLOW EXTRA LENGTH ON HARDWARE FOR UNEVENESS OF MOUNTING SURFACE.

3. LIFTING BASE OR FUEL TANK PARIMETER IS SHOWN. FOUNDATION SHOULD BE EXTENDED BEYOND THIS PERIMETER. SEE (T030) APPLICATION MANUAL.

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS
DIM: X ±3; .X ±0.8; .XX± 0.38
HOLE: 0.00- 4.99 +0.15/-0.08; 5.00- 9.99 +0.20/-0.10; 10.00-17.49 +0.25/-0.13; 17.50-24.99 +0.30/-0.13
ANG TOL: ± 1.0°
SCALE: 3/32
SIM TO 0500-3845
DO NOT SCALE PRINT
- CONFIDENTIAL - PROPERTY OF CUMMINS POWER GENERATION GROUP
DWN M_JOHNSON
CKD Z_MOGES
APVD Z_MOGES
DATE 11JAN11
FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ASME Y14.5M-1994
FIRST USED ON DFEG-EK
SITE CODE PGA
CUMMINS POWER GENERATION
OUTLINE, GENSET (FOUNDATION)
DWG SIZE D
A035F951
SHEET 1 of 2
DWG REV A

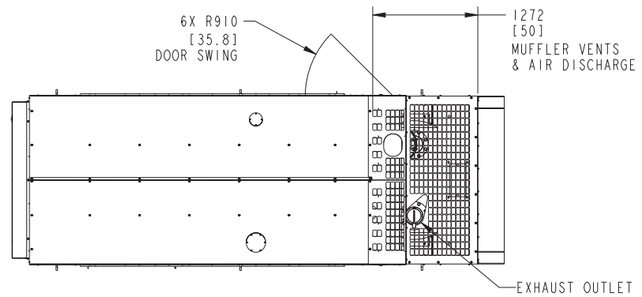
Drawing Name: A035F952 Revision: A
Part Name: A035F951 Revision: A
Sheet 1 of 3

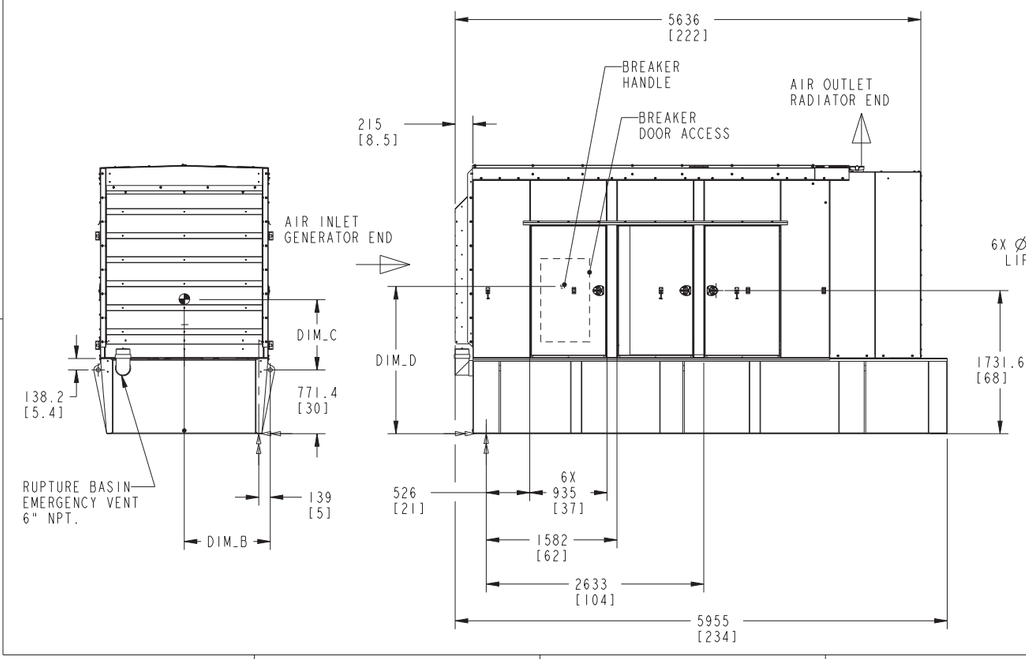
TABULATION		
TANK/LIFT BASE FEATURE CODE	TANK CAPACITY	TANK WEIGHT DRY KG (LBS)
C209	1700	2168 (4780)

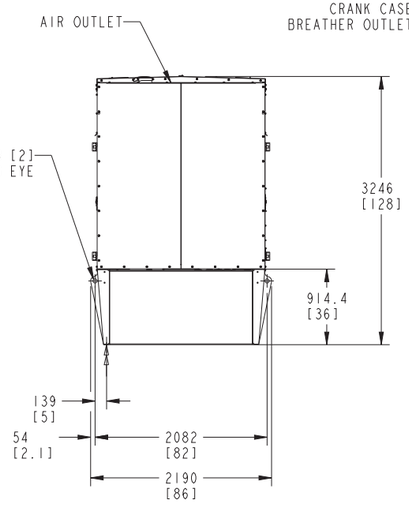
TABULATION						
MODEL	KW	CG_DIM "A"	CG_DIM "B"	CG_DIM "C"	IBC-STEEL ENCLOSURE WEIGHT KG (LBS) ±5%	IBC-ALUMINUM ENCLOSURE WEIGHT KG (LBS)
DFEG	350	2159 [85]	1041 [41]	676 [26.6]	8276 (18246)	7786 (17156)
DFEH	400	2139 [84.2]			8406 (18532)	7916 (17442)
DFEJ	450	2118 [83.4]		681 [26.8]	8558 (18870)	8069 (17780)
DFEK	500	2093 [82.4]			8695 (19170)	8205 (18080)
DQHAA	275	2154 [84.9]		709 [29.9]	6638 (14635)	6148 (13545)
DQHAB	300	2144 [84.4]		714 [28.1]	6752 (14885)	6262 (13795)
***WEIGHT & CG'S ARE SHOWN WITH 1700 GALLON FUEL TANK, ENCLOSURE, AND STANDARD WET GENSET. ADDITION OF OTHER FEATURES MAY CHANGE THE WEIGHT.						

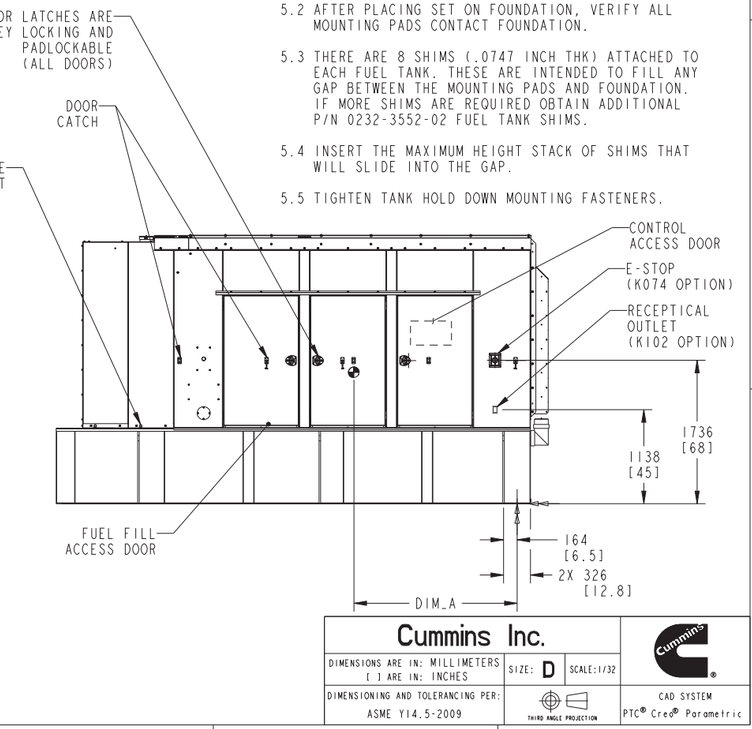
OPTIONAL FEATURE
F202,F205

TABULATION					
TANK/LIFT BASE FEATURE CODE	TANK CAPACITY	DIM_D QSMII L-FRAME	DIM_D QSMII P-FRAME	DIM_D QSXI5 L-FRAME	DIM_D QSXI5 P-FRAME
C209	1700	2104.9 [82.87]	1957.1 [77.05]	2317.5 [91.24]	2169.7 [85.42]
C211	2525	N/A	N/A	2317.5 [91.24]	2169.7 [85.42]









NOTES:

1. (NOTE REMOVED)
2. FOUNDATION REFERENCE POINT (⇨). SEE FOUNDATION DRAWING FOR DETAILS.
3. FOR FEATURE CODE LI16 & LI20 (FLORIDA & MICHIGAN TANKS) ADD 162.6 [6.4] TO DIMS FROM BOTTOM OF TANK
4. SEE SHEET 2 FOR TANK VENT LOCATIONS.
5. SUBBASE FUEL TANK MOUNTING.
   THE TANK SHOULD BE MOUNTED SUCH THAT AN AIR SPACE IS PROVIDED BETWEEN THE BOTTOM OF THE TANK AND THE FOUNDATION UNDERNEATH. VIBRATION MOUNTING PADS P/N 0402-0202 MAY BE USED TO PROVIDE AN AIR SPACE.

   EXCESSIVE TWISTING OF THE FUEL TANK, WHEN FASTENING IT TO A FOUNDATION, MAY RESULT IN STRUCTURAL FAILURE OF THE TANK. TO INSURE THE INSTALLATION DOES NOT EXCESSIVELY TWIST THE FUEL TANK, THE FOLLOWING PROCEDURE MUST BE OBSERVED:

   5.1 REFER TO ONAN APPLICATION MANUAL T030 FOR GENERAL GENSET/TANK MOUNTING GUIDELINES.

   5.2 AFTER PLACING SET ON FOUNDATION, VERIFY ALL MOUNTING PADS CONTACT FOUNDATION.

   5.3 THERE ARE 8 SHIMS (.0747 INCH THK) ATTACHED TO EACH FUEL TANK. THESE ARE INTENDED TO FILL ANY GAP BETWEEN THE MOUNTING PADS AND FOUNDATION. IF MORE SHIMS ARE REQUIRED OBTAIN ADDITIONAL P/N 0232-3552-02 FUEL TANK SHIMS.

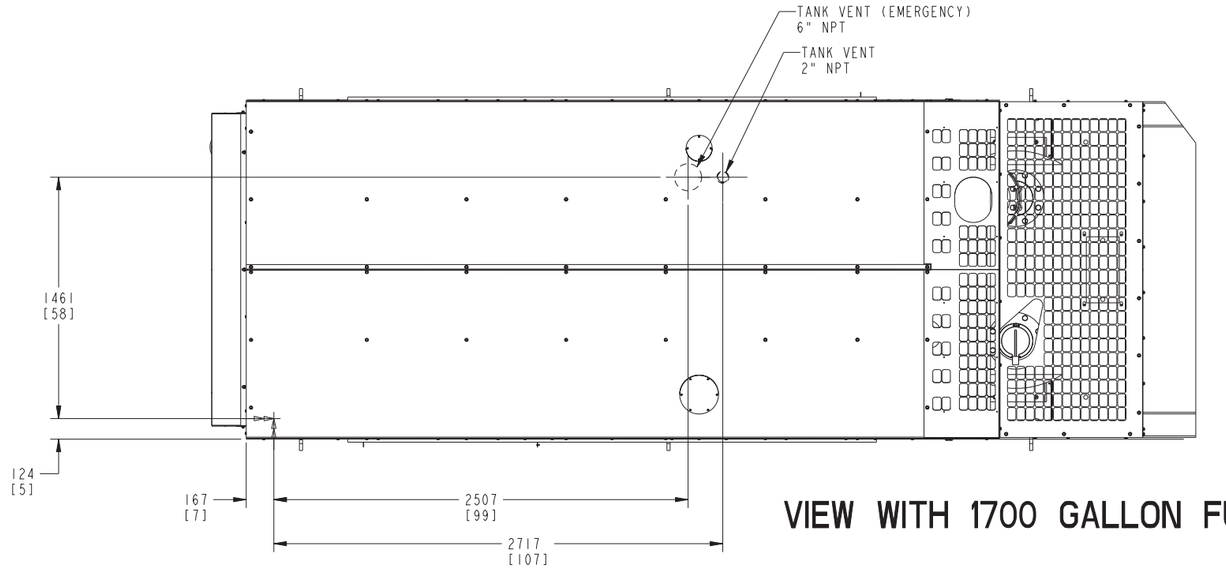
   5.4 INSERT THE MAXIMUM HEIGHT STACK OF SHIMS THAT WILL SLIDE INTO THE GAP.

   5.5 TIGHTEN TANK HOLD DOWN MOUNTING FASTENERS.

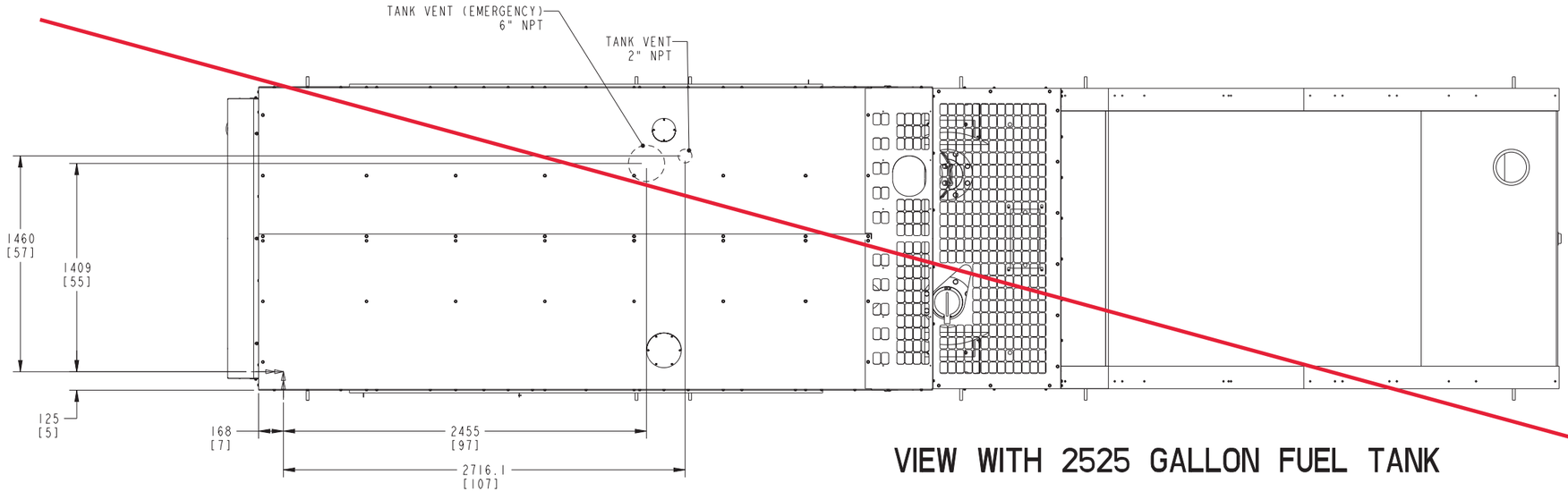
Cummins Inc.		
DIMENSIONS ARE IN: MILLIMETERS [ ] ARE IN: INCHES	SIZE: D	SCALE: 1/32
DIMENSIONING AND TOLERANCING PER: ASME Y14.5-2009	THIRD ANGLE PROJECTION	CAD SYSTEM PTC® Creo® Parametric

Document Generated: 10OCT2019 15:01 GMT

Part Number: **A034J593** Part Revision: **E**
Part Name: **OUTLINE,ENCLOSURE**
Drawing Category: **Detail** State: **Released**



VIEW WITH 1700 GALLON FUEL TANK



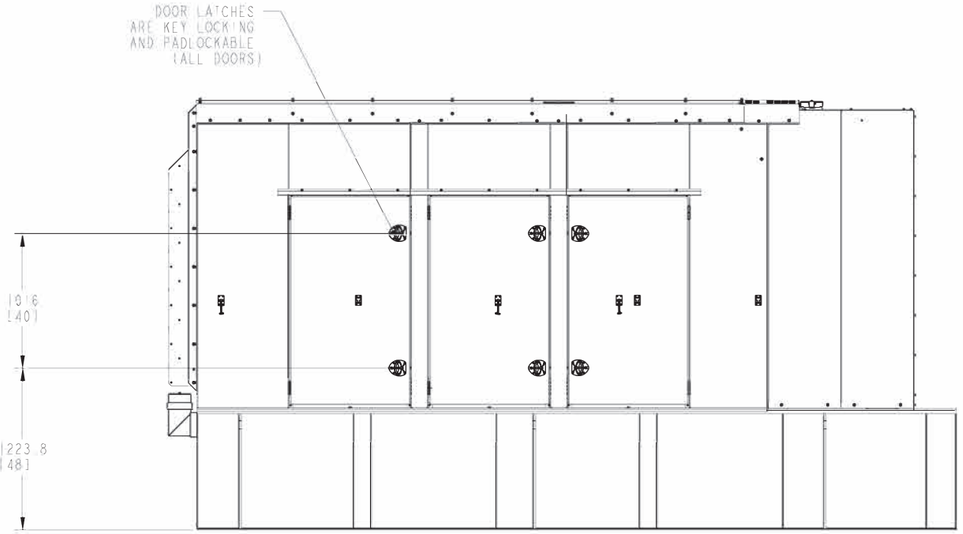
VIEW WITH 2525 GALLON FUEL TANK

Cummins Inc.		
DIMENSIONS ARE IN: MILLIMETERS [ ] ARE IN: INCHES	SIZE: D	SCALE:3/32
DIMENSIONING AND TOLERANCING PER: ASME Y14.5-2009	THIRD ANGLE PROJECTION	CAD SYSTEM PTC® Creo® Parametric

Document Generated: **10OCT2019 15:01 GMT**

Part Number: **A034J593** Part Revision: **E**
Part Name: **OUTLINE,ENCLOSURE**
Drawing Category: **Detail** State: **Released**

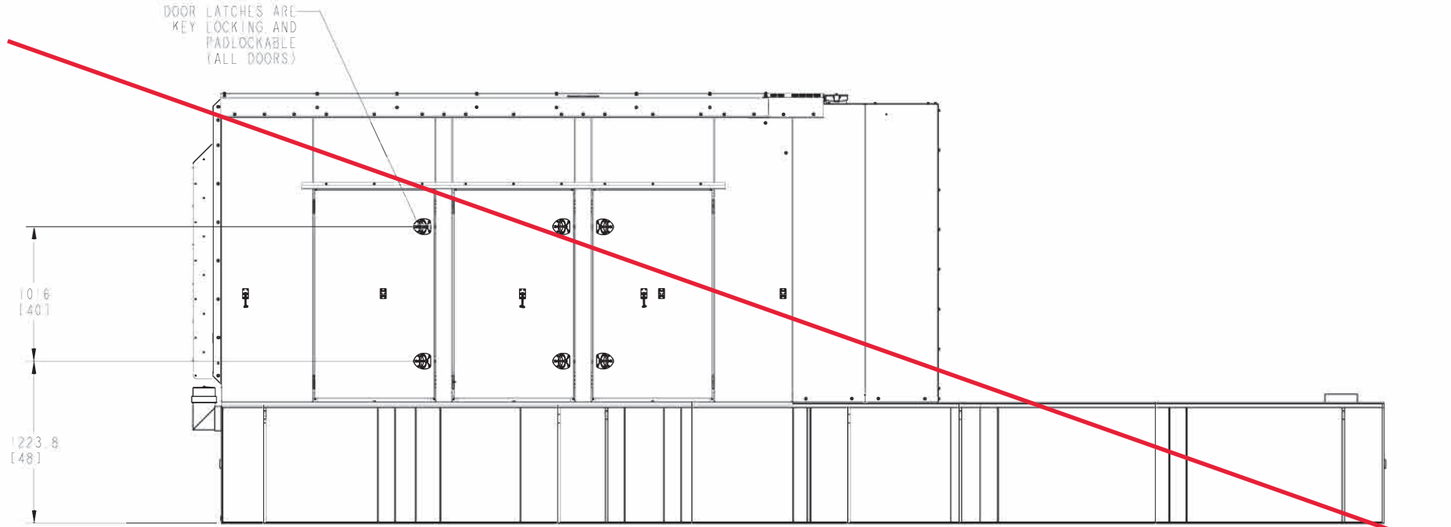
OPTIONAL FEATURE
150 MPH RATING
F207



VIEW WITH 1700 GALLON FUEL TANK

NOTES:

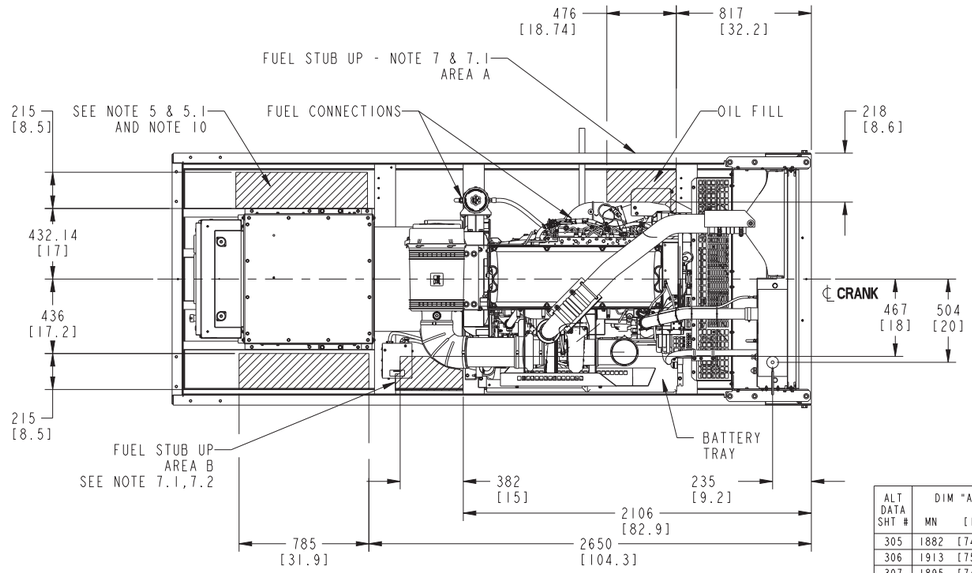
1. ALL DIMENSIONS NOT SHOWN ARE IDENTICAL TO THOSE SHOWN ON SHEET 1.
2. THE ENCLOSURE IS ENGINEERED TO MAINTAIN IT'S INTEGRITY WITH A 150 MPH WIND LOAD CONDITION.



VIEW WITH 2525 GALLON FUEL TANK

Cummins Inc.	
DIMENSIONS ARE IN: MILLIMETERS [ ] ARE IN: INCHES	SIZE: D SCALE: 1/32
DIMENSIONING AND TOLERANCING PER ASME Y14.5-2009	THIRD ANGLE PROJECTION
	CAD SYSTEM PTC® Creo® Parametric

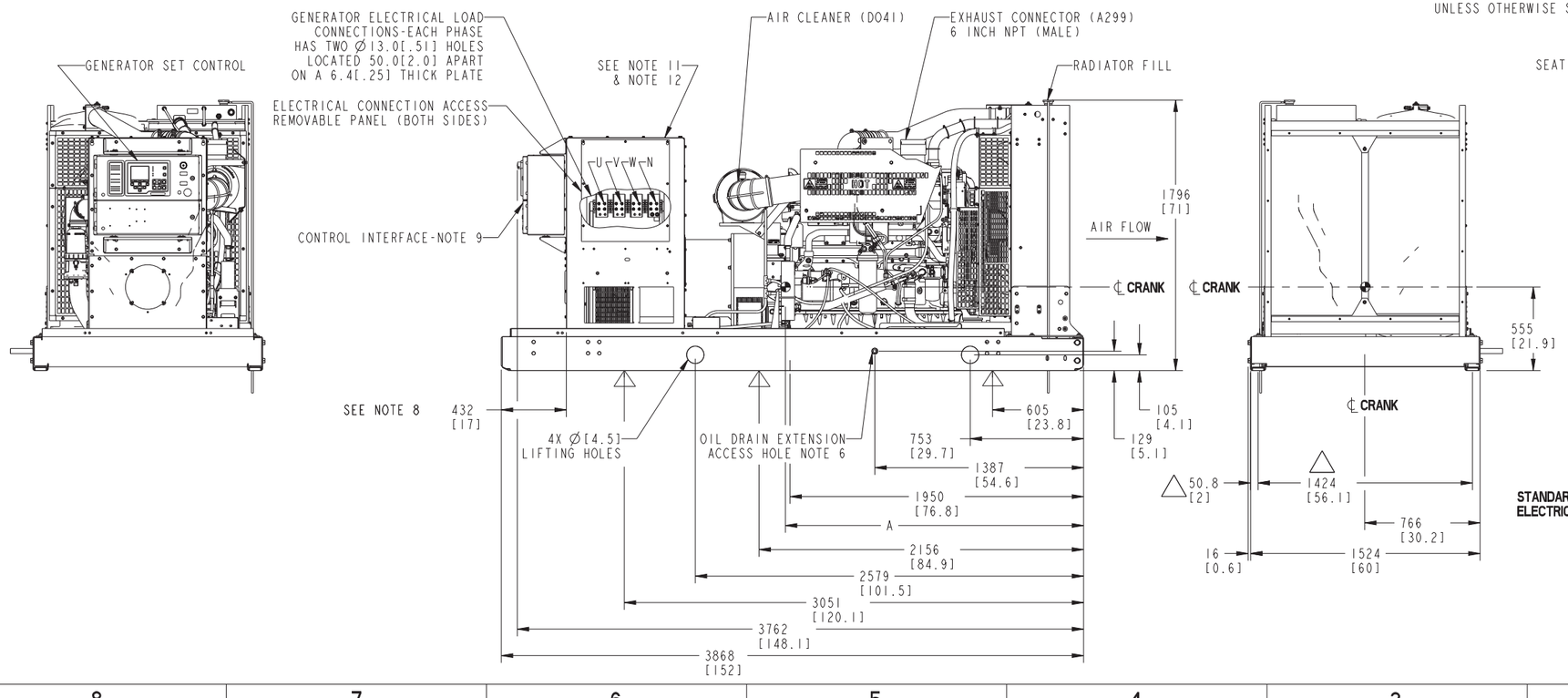
Document Generated: **10OCT2019 15:01 GMT**



ALT DATA SHT #	DIM "A" MN	DIM "A" [IN]	GEN SET WET WEIGHT KG	GEN SET WET WEIGHT [LB]
305	1882	[74.1]	4132	[9105]
306	1913	[75.3]	4262	[9385]
307	1895	[74.6]	4132	[9105]
308	1981	[78.0]	4542	[10005]

NOTES:

1. DIMENSIONS SHOWN IN [ ] ARE IN INCHES.
2. Ø21 [.83] HOLES MARKED BY △ ARE FOR 6 POINT ISOLATION MOUNTING OR SECURING TO MOUNTING SUFACE.
3. GENSET SUPPLIED WITH FLEXIBLE FUEL LINES THAT CAN BE CONNECTED TO GENERATOR SET INTERFACE POINTS.
   3.1. FUEL SUPPLY LINE: 1700 [67] LONG WITH 1/2-14 NPT (MALE) TERMINATION.
   FUEL RETURN LINE: 1500 [59] LONG WITH 1/2-14 NPT (MALE) TERMINATION.
4. TABULATED WEIGHT AND CG IS FOR GENERATOR SET WITH NO OPTIONS.
5. REFER TO CIRCUIT BREAKER OUTLINE DRAWING FOR ELECTRICAL STUB-UP AREA FOR SPECIFIC BREAKERS.
   5.1. REFER TO SUBBASE FUEL TANK OUTLINE DRAWING FOR ELECTRICAL STUB-UP AREA AVAILABLE WITH FUEL TANKS.
6. OIL DRAIN ACCESS HOLE LOCATED ON FARSIDE WHEN GENSET IS NOT EQUIPPED WITH IN-SKID FUEL TANK.
7. FUEL STUB-UP AREA "A" IS NOT AVAILABLE WITH IN-SKID TANK.
   7.1. FUEL STUB-UP AREAS SHOWN ARE NOT AVAILABLE WITH SUBBASE FUEL TANK REFER TO SUBBASE FUEL TANK OUTLINE FOR AVAILABLE STUB-UP AREAS.
   7.2. FUEL STUB-UP AREA "B" IS AVAILABLE FOR IN-SKID TNK.
8. DIMENSION IS △3 AS INDICATED ON CIRCUIT BREAKER OUTLINE DRAWING (A052W386).
9. CONTROL INTERFACE CONNECTIONS SHOULD BE MADE WITH FLEXIBLE CONNECTIONS. NOT RIGID CONDUIT.
10. FOR ENTRANCE BOX APPLICATIONS SEE APPLICABLE ENTRANCE BOX OUTLINE DRAWING.
11. OPTIONAL ENTRANCE BOX (NOT SHOWN) WILL BE MOUNTED ON THE RIGHT SIDE AS VIEWED FROM THE CONTROL.
12. OPTIONAL BREAKER BOX (NOT SHOWN) WILL BE MOUNTED ON THE LEFT SIDE AS VIEWED FROM THE CONTROL UNLESS OTHERWISE SPECIFIED.



STANDARD SKID BASE SHOWN WITH NO ELECTRICAL OUTPUT BOX

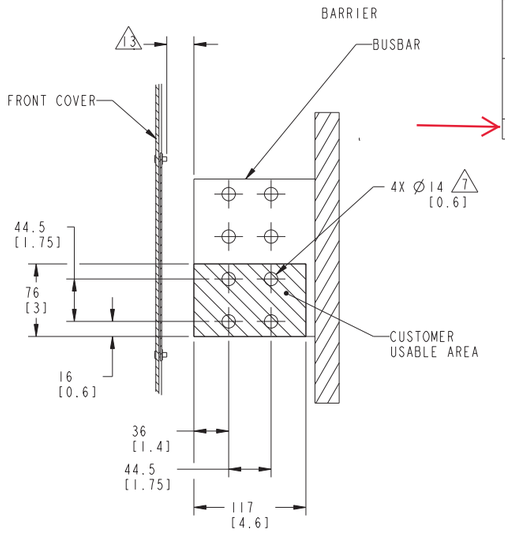
MODEL/PLATFORM: QSX15-RP		THIS PART IS SIMILAR TO:
UNLESS OTHERWISE SPECIFIED THE FOLLOWING SHALL APPLY		ANG. TOL.: ± 1°
DIMENSIONAL TOLERANCES: X ± 1	.X ± 0.8	.XX ± 0.38
Cummins Inc.		
DIMENSIONS ARE IN: MILLIMETERS [ ] ARE IN: -	SIZE: D	SCALE:0.063
DIMENSIONING AND TOLERANCING PER: ASME Y14.5-2009	THIRD ANGLE PROJECTION	CAD SYSTEM PTC® Creo® Parametric

Document Generated: **22OCT2019 16:27 GMT**

Part Number: **A063J084** Part Revision: **B**
Part Name: **OUTLINE,GENSET**
Drawing Category: **Outline** State: **Released**

PTC® Creo® Parametric

REL NO	LTR	NO	REVISION	DRN	CKD	APVD	DATE
ECO-153235	B	1	SEE SHEET 2	MLL	JCB	J_BRODY	17JUN15
		2	SEE SHEET 2	MLL	JCB	J_BRODY	17JUN15
		3	SEE SHEET 3	MLL	JCB	J_BRODY	17JUN15
		4	SEE SHEET 3	MLL	JCB	J_BRODY	17JUN15

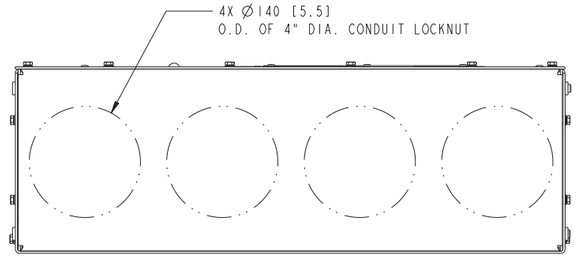


LUG INSTALLATION AREA
SECTION A-A (FROM SHEET 2 & 3)
SCALE 3/8

△11

△15 TYPICAL CONDUIT AND WIRE SIZE BASED ON NEC 2008, ARTICLE 310.15 AT 75C TEMPURATURE RATED CONDUCTOR AT 40C AMBIENT AND ANNEX C (LIQUID TIGHT FLEXIBLE METAL CONDUIT - LFCM)

MODEL NAME	WIRE (COPPER)		CONDUIT	
	QTY	SIZE	QTY	SIZE
DFEJ	4	500 MCM	4	4"



CONDUIT PATTERN
SECTION B-B (FROM SHEET 2 & 3)

NOTES:

1 ALL DIMENSIONS ARE FOR REFERENCE ONLY.

2 DIMENSIONS SHOWN IN [ ] ARE IN INCHES.

3 MAXIMUM CAPABILITY OF COPPER CABLES IS 600 MCM, QTY=6 PER PHASE.

4 COMPRESSION LUGS OR MECHANICAL LUGS ARE ALLOWED,

△5 EQUIPMENT GROUND AND GROUNDING ELECTRODE LUG IS MECHANICAL TYPE,
COPPER 400 MCM -6 AWG
SCREW 11/16" - 16 UNF-2B
5/16" HEX WRENCH
RECOMMENDED TORQUES:
250MCM-1 AWG -375 IN-LBS
2-6 AWG -275 IN-LBS

		CUMMINS PART #	SUPPLIER PART #
6	SUGGESTED 500 MCM COMPRESSION LUG	0332_4362	BLACKBURN/CTL5002
	SUGGESTED #2-600 MCM MECHANICAL LUGS	0332_3949	BURNDY/KK3A36U-4N

△7 USE STANDARD HARDWARE AND TORQUE TO INSTALL COMPRESSION/MECHANICAL LUGS TO BUSBAR.

△8 USE STANDARD HARDWARE TO INSTALL CUSTOMER CONNECTION CABLE TO MECHANICAL LUG. RECOMMENDED TORQUE TO 42.4 Nm [31.3 FT-LBS]

△9 LUGS TO BE INSTALLED IN SAME ORIENTATION ON OTHER TERMINAL PHASES (PHASE - L1 SHOWN ONLY).

△10 DIMENSION TO INSIDE OF TERMINAL BOX.

△11 NEMA 4 HOLE PATTERN (USE DIMENSIONS TO SELECT LUGS)

12 LUGS, CUSTOMER CONNECTION CABLE AND HARDWARE ARE PROVIDED BY CUSTOMER.

△13 DISTANCE TO BE ENSURED BETWEEN LUG AND BARRIER (NO LESS THAN ONE INCH).

14 ONE CONDUIT WIRED FOR REFERENCE ONLY.

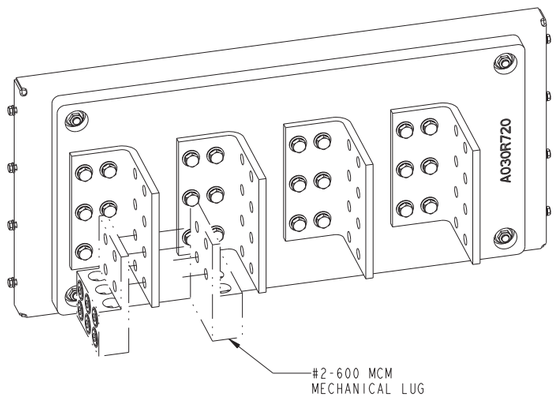
△15 THESE WIRE-CONDUIT COMBINATIONS MEET NEC AND CEC. TO USE OTHER COMBINATIONS, REFER TO APPLICABLE CODES TO ENSURE THAT WIRE AMPACITY. BEND SPACE AND GUTTER SPACE MEET THE REQUIREMENTS.

△16 MINIMUM WIRE BENDING SPACE AT TERMINALS CALCULATED PER NEC TABLE 312.6(B) USING 500 MCM CABLES (4 WIRES PER TERMINAL).

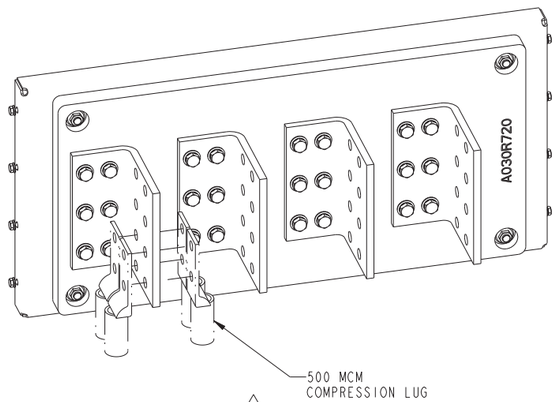
NUMBER OF CONDUCTORS PER PHASE CALCULATED PER TABLE 310.16 USING COPPER CABLES RATED AT 75° C ON A MAXIMUM AMBIENT TEMP OF 40° C.

△17 MINIMUM WIRE BENDING SPACE AT GROUND TERMINALS CALCULATED PER NEC TABLE 312.6(A) USING [3/0-14] CABLES (1 WIRE PER TERMINAL), MECHANICAL LUGS USED AS TERMINALS.

18 GENSET MODEL DFEJ USED FOR ALL VIEW REPRESENTATION



MECHANICAL LUG OPTION
INSTALLATION
(PHASE L1 SHOWN)



△9

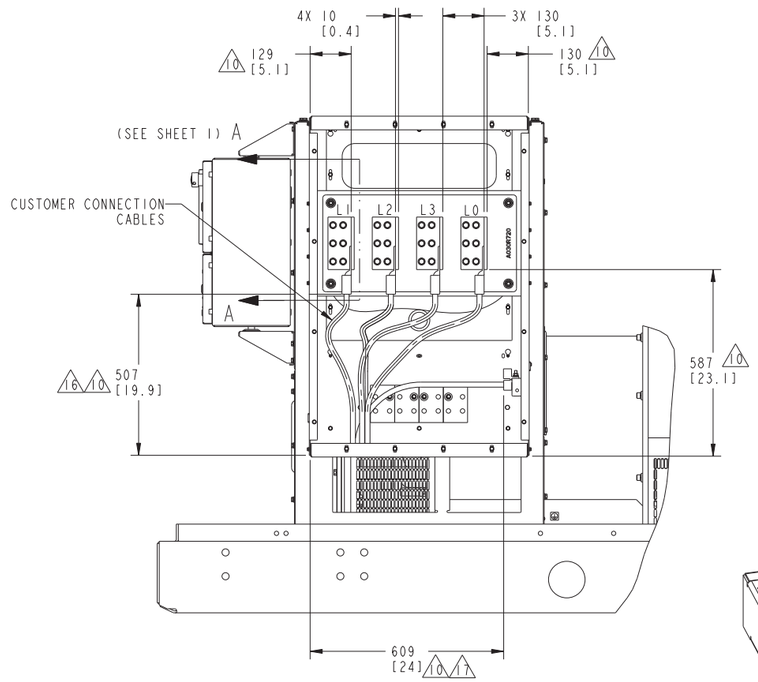
COMPRESSION LUG OPTION INSTALLATION
(PHASE-L1 SHOWN)

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS	SIM TO A040F616	DRN M_LEHR		CUMMINS POWER GENERATION	
DIM: X ±1, .X ±0.8, .XX± 0.38 — HOLE: 0.00- 4.99 +0.15/-0.08; 5.00- 9.99 +0.20/-0.10; 10.00-17.49 +0.25/-0.13; 17.50-24.99 +0.30/-0.13	DO NOT SCALE PRINT	CKD J_BRODY		OUTLINE, TERMINAL BOX	
	- CONFIDENTIAL - PROPERTY OF CUMMINS POWER GENERATION GROUP	APVD J_BRODY	SITE CODE		
		DATE 20MAY15			
ANG TOL: ± 1.0° — SCALE: 5/16	FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ASME Y14.5M-1994	FIRST USED ON DFEJ	PGF	DWG SIZE D — A052W779 — SHEET 1 of 3 — DWG REV B	

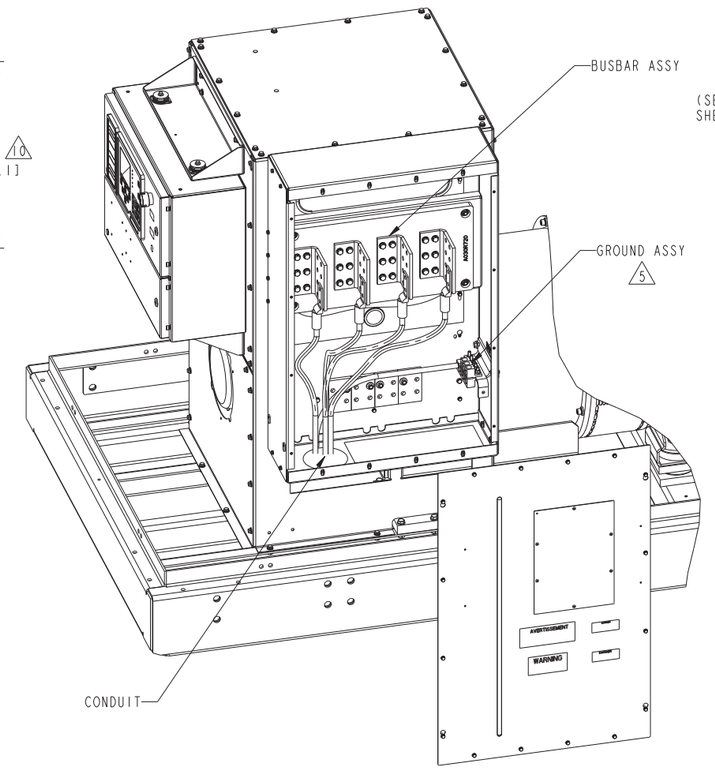
PTC® Creo® Parametric

REL NO	LTR	NO	REVISION	DRN	CKD	APVD	DATE
ECO-153235	B	1	REVISE CUSTOMER CONNECTION CABLES PICTORIALLY	MLL	JCB	J_BRODY	17JUN15
		2	ZONE A4; ADD LEADER TO CONDUIT NOTE	MLL	JCB	J_BRODY	17JUN15

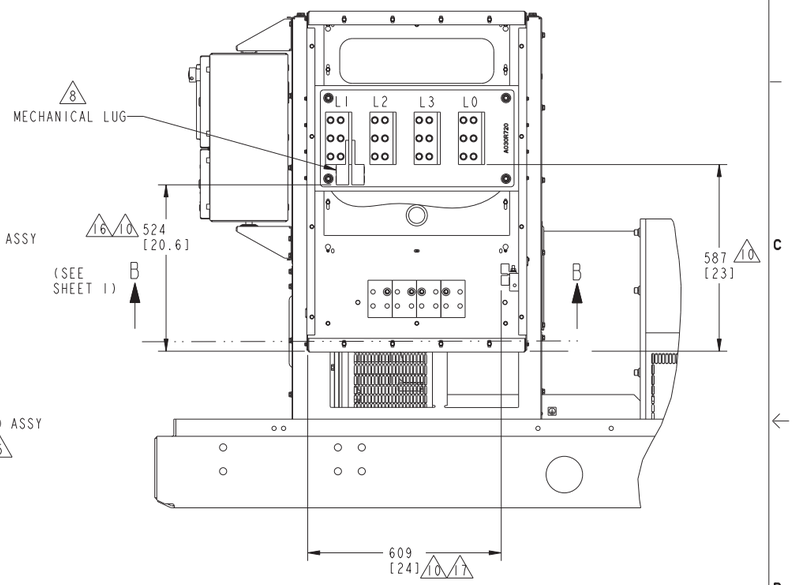
DFEJ TERMINAL BOX (RIGHT HAND BOTTOM ENTRY CONFIGURATION SHOWN)



TERMINAL BOX WITH COMPRESSION LUG OPTION (LUGS ARE CUSTOMER PROVIDED)



TERMINAL BOX WITH MECHANICAL LUG OPTION (LUGS ARE CUSTOMER PROVIDED)

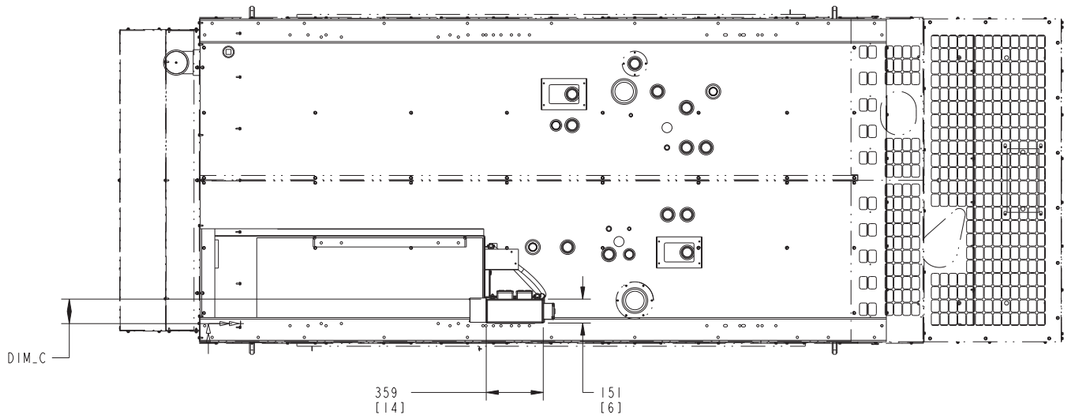


UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS			SIM TO A040F616	DRN M_LEHR		CUMMINS POWER GENERATION
DIM: X ±1; .X ±0.8; .XX± 0.38	HOLE: 0.00- 4.99 +0.15/-0.08; 5.00- 9.99 +0.20/-0.10; 10.00-17.49 +0.25/-0.13; 17.50-24.99 +0.30/-0.13		DO NOT SCALE PRINT	CKD J_BRODY	SITE CODE	OUTLINE, TERMINAL BOX
ANG TOL: ± 1.0°	SCALE: 1/8		- CONFIDENTIAL - PROPERTY OF CUMMINS POWER GENERATION GROUP	APVD J_BRODY; DATE 20MAY15; FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ASME Y14.5M-1994; FIRST USED ON DFEJ	PGF	DWG SIZE D; A052W779; SHEET 2 OF 3; DWG REV B

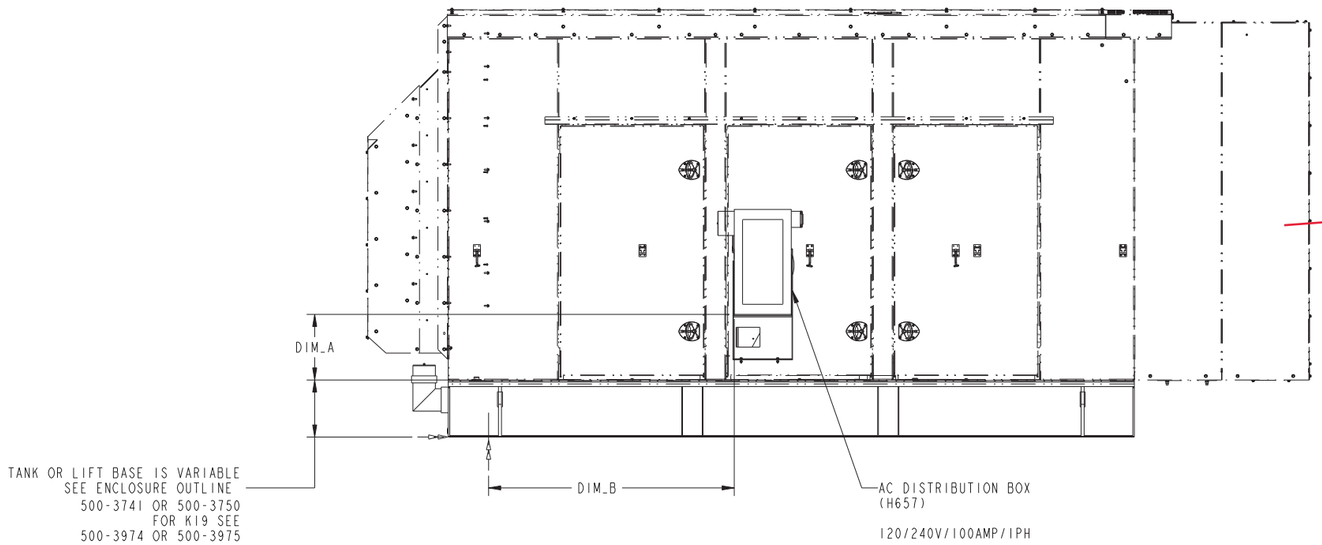
Drawing Name: A052W780 Revision: B
Part Name: A052W779 Revision: B
Sheet 2 of 4

Pro/ENGINEER

REL NO	LTR	NO	REVISION	DRN	CKD	APVD	DATE
ECO-131569	H	2	DRAWING HAS BEEN PICTORIALLY UPDATED	MP	GT	G.THARIVITLA	15JAN13
		3	ZONE (A3),(A4) RMV PHRASE "SQUARE ---"	-	-	-	-
			NOOD12L100CU"	MP	GT	G.THARIVITLA	15JAN13



DFEG,DFEH,DFEJ,DFEK CONFIGURATION SHOWN



AC DISTRIBUTION PANEL NOTES:

WARNING:

WHEN A FUEL TRANSFER PUMP IS INCLUDED WITH THE SET, THE AC DISTRIBUTION PANEL MUST BE FED FROM A TRANSFER SWITCH AND STEP-DOWN TRANSFORMER TO MAINTAIN 120V POWER TO THE PUMP WHEN UTILITY POWER IS INTERRUPTED. NONE OF THE OTHER AC DISTRIBUTION PANEL LOADS ARE NEEDED FOR THE SET TO OPERATE, SO THE PANEL COULD BE FED FROM A NON-EMERGENCY SOURCE IF NO PUMP IS INSTALLED.

ALL CONNECTIONS TO THE AC DISTRIBUTION PANEL ARE TO BE DONE IN COMPLIANCE WITH THE NATIONAL ELECTRIC CODE AND ALL APPLICABLE LOCAL CODES AND STANDARDS USING 60 OR 75 DEGREE CONDUCTORS.

THE AC DISTRIBUTION PANEL IS DESIGNED TO BE FED WITH A 100AMP, 120/240, SINGLE PHASE FEEDER. THE TWO LINE CONDUCTORS CONNECT INTO THE 100AMP MAIN BREAKER. IT IS LISTED FOR #4 TO 2/0 CONDUCTORES, AL OR CU WHEN TORQED TO 50 IN-LB. THE NEUTRAL CONDUCTOR CONNECTS INTO THE NEUTRAL BUS. IT IS LISTED FOR #5 TO 300KCMIL CONDUCTORS, AL OR CU WHEN TORQUED TO 21 FT-LB. THE GROUNDING CONDUCTOR, IF USED CONNECTS INTO THE GROUND BAR. IT IS LISTED FOR #1 TO 2/0 CONDUCTORS, AL OR CU WHEN TORQUED TO 17FT-LB

REFER TO THE FOUNDATION LAYOUT DRAWING FOR THE LOCATION AVAILABLE FOR DISTRIBUTION PANEL STUB-UP.

FOUNDATION REFERENCE POINT (⟷).
SEE FOUNDATION DRAWING FOR DETAILS.

DIMENSIONS IN [ ] ARE INCHES.

TABULATION			
MODEL	DIM_A	DIM_B	DIM_C
DFAB,DFAC,DQAD,DQAE,DQAF	145 [5.7]	1525 [60.0]	181 [7.13]
DFBF,DFCB,DFCC,DFCE	15 [0.6]	1593 [62.7]	150 [5.90]
DFEG,DFEH,DFEJ,DFEK,DQHAA,DQHAB	416 [16.38]	1546 [60.87]	152 [6]
DFEB,DFEC,DFED	292 [11.5]	1674 [65.9]	206 [8.1]
DQDAA.DQDAB.DQDAC	149 [5.9]	1525 [60.0]	193 [7.6]

AC DISTRIBUTION BOX

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS

DIM		HOLE
X ±1		0.00- 4.99 +0.15/-0.08
.X ± 0.5		5.00- 9.99 +0.20/-0.10
.XX± 0.25		10.00-17.49 +0.25/-0.13
		17.50-24.99 +0.30/-0.13

ANG TOL: ± 0.5° SCALE: 1/16

DO NOT SCALE PRINT

- CONFIDENTIAL -
PROPERTY OF CUMMINS POWER GENERATION GROUP

DRN J_JOHNSON
CKD R_ENGELMANN
APVD R_ENGELMANN
DATE 03-28-03
FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ASME Y14.5M-1994
FIRST USED ON DFA-DFE

SITE CODE CPG

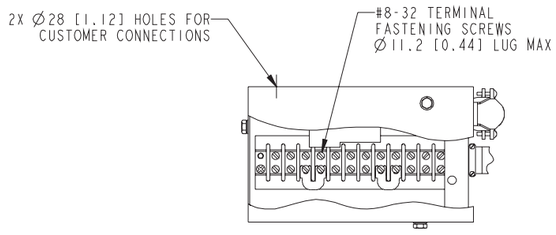
CUMMINS POWER GENERATION
GENSET_OUTLINE
(OPTIONS)

DWG SIZE D | 0500_3749 | SHEET 2 OF 3 | DWG REV H

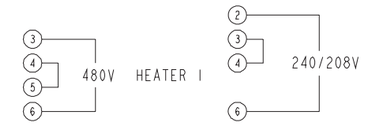
Drawing Name: 0500-3749 Revision: H
Part Name: 0500-3749 Revision: H
Sheet 2 of 4

0500_3820	D	Pro/ENGINEER	METRIC DWG

REL NO	LTR	NO	REVISION	ZONE	DR	CHKR	APPROVED	DATE
FRD16606	A	1	PRODUCTION_RELEASE	-	WP	WP	EK	05-06-03



DETAIL OF HETER TERMINAL BOX



480 VOLT STANDARD FACTORY CONNECTION

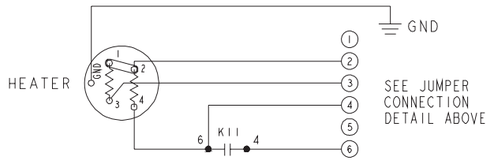
240/208 VOLT OPTIONAL CONNECTION

JUMPER CONNECTION DETAIL

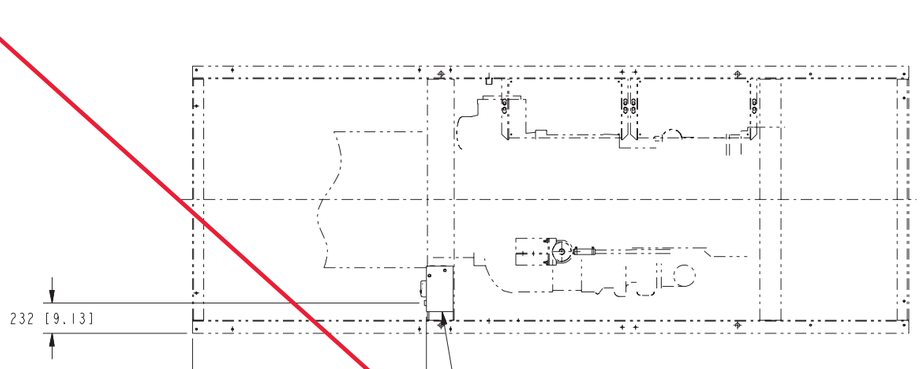
NOTES:

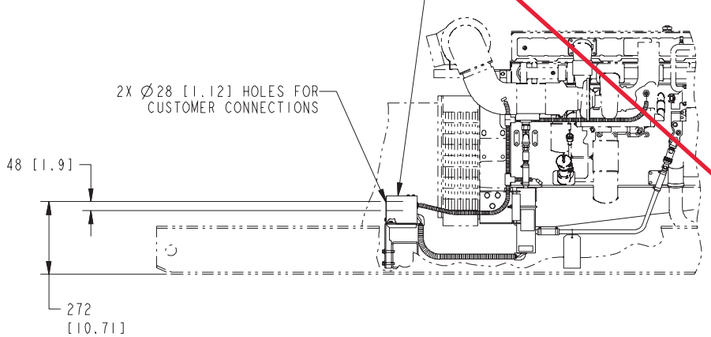
1. DIMENSIONS IN [ ] ARE INCHES.
2. THE HEATER CONTROL RELAY DRAWS 83mA OF CURRENT WHEN THE HEATERS ARE UNPOWERED. HEATERS ARE NOT POWERED WHEN:
   1) THE ENGINE HAS REACHED DESIGN TEMPERATURE OR
   2) THE ENGINE IS RUNNING.

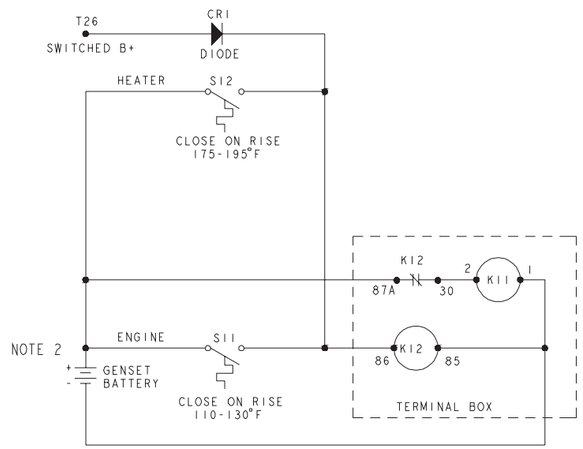
⚠ A BATTERY CHARGER IS REQUIRED TO PREVENT BATTERY DISCHARGE.



AC POWER SCHEMATIC







DC CONTROL SCHEMATIC

HEATER AMPERAGE TABLE

SINGLE PHASE HEATER VOLTAGE	FEATURE CODE H556 ONE HEATER		FEATURE CODE H557 ONE HEATER	
	HEATER AMPS	TOTAL WATTS	HEATER AMPS	TOTAL WATTS
208	18.0	3744	23.2	4825
240	20.8	4990	26.75	6420
480	10.4	4990	13.375	6420

ITEM	PART NO	DWG SIZE	DESCRIPTION OR MATERIAL	QTY	KIT DES
			SIM TO 0500-3312		

DO NOT SCALE PRINT

TOLERANCE UNLESS OTHERWISE SPECIFIED

DIM	mm	inch
	X ± 1	.X ±
	.X ± 0.8	.XX ±
	.XX ± 0.38	.XXX±
HOLE	0.99- 4.99 ±0.15/-0.08	.004-.200 +.006/-.003
	5.00- 9.99 ±0.20/-0.10	.201-.421 +.008/-.004
	10.00-17.49 ±0.25/-0.13	.422-.703 +.010/-.005
	17.50-24.99 ±0.30/-0.13	.704-.999 +.012/-.005

ANG TOL± 1.0°

DRAWN TO SCALE OF 1/1

COPIED FROM -

THIRD ANGLE PROJECTION

	NAME	DATE
DR	W_PELTIER	05-06-03
CHKR ☐ MFG ☐	W PELTIER	05-06-03
APPROVED	E KROHNFELDT	05-06-03

FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ANSI Y14.5M-1982

MODEL FIRST USED ON: DFEH,EJ,EK

SITE CODE: PGA

CUMMINS POWER GENERATION
1400 73RD AVE NE
MINNEAPOLIS, MINNESOTA 55432

TITLE: INTERFACE_OUTLINE (HEATER)

DRG NO: 0500_3820

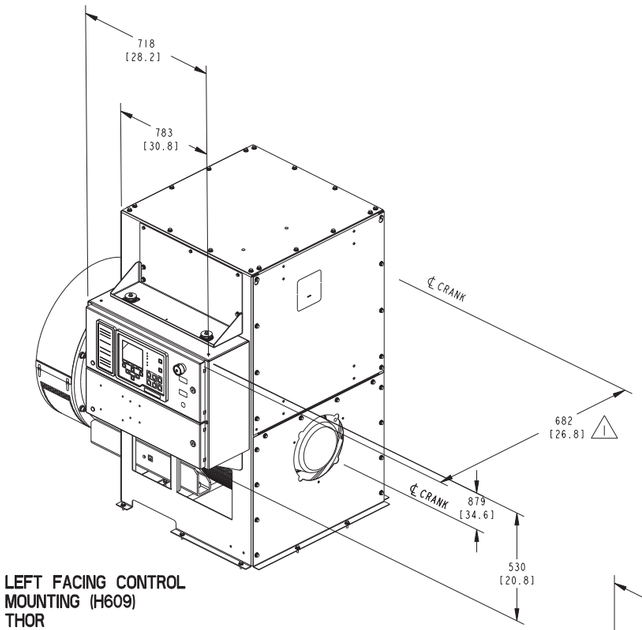
SHEET 1 of 1

DRG SIZE: D

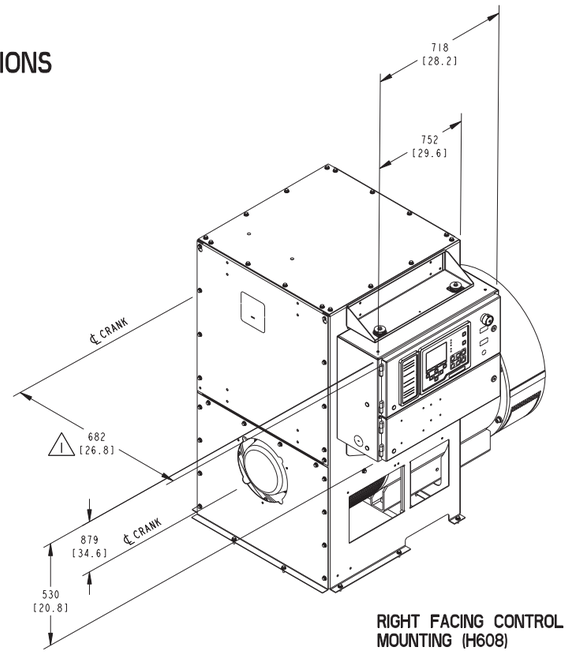
PTC® Creo® Parametric

REL NO	LTR	NO	REVISION	DRN	CKD	APVD	DATE
ECO-152559	A	1	PRODUCTION_RELEASE	MLL	JCB	J_BRODY	19MAY15

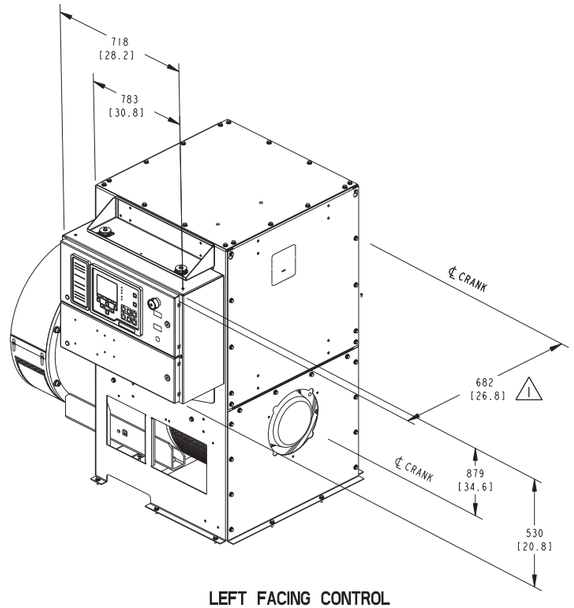
CONTROL BOX LOCATIONS



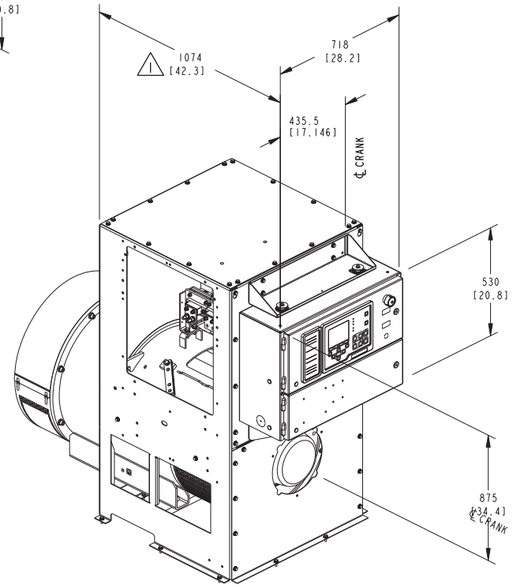
LEFT FACING CONTROL
MOUNTING (H609)
THOR



RIGHT FACING CONTROL
MOUNTING (H608)



LEFT FACING CONTROL
MOUNTING (H609)
NONTHOR



FRONT FACING CONTROL
MOUNTING (H679)

NOTE:
⚠1 DIMENSION TO FACE OF CONTROL BOX. COMPONENTS ON FACE EXTEND 34.3 [1.35] BEYOND FACE.

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS			SIM TO A041F617	DRN M_LEHR		CUMMINS POWER GENERATION	
DIM: X ± 1; .X ± 0.8; .XX± 0.38	HOLE: 0.00- 4.99 +0.15/-0.08; 5.00- 9.99 +0.20/-0.10; 10.00-17.49 +0.25/-0.13; 17.50-24.99 +0.30/-0.13		DO NOT SCALE PRINT	CKD J_BRODY		OUTLINE,GENSET	
ANG TOL: ± 1.0°	SCALE: 3/32		- CONFIDENTIAL - PROPERTY OF CUMMINS POWER GENERATION GROUP	APVD J_BRODY	SITE CODE		
				DATE 19MAY15	PGF	DWG SIZE D: A052W391	SHEET 2 of 2; DWG REV A
				FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ASME Y14.5M-1994	FIRST USED ON DFEJ,DFEK		

Four-stage battery charger

15 amp @ 12 volt
12 amp @ 24 volt

Ships Loose for Others to Install

> Specification sheet

Our energy working for you.™

Power Generation

Description

Cummins Power Generation fully automatic battery chargers - using switched mode power electronics - are constant voltage/constant current chargers incorporating a 4-stage charging algorithm. Designed for use in applications where battery life and reliability are important; these chargers, complete with built-in equalize charge capability, are ideal for stationary or portable starting battery charging service.

To achieve optimum battery life, a 4-stage charging cycle is implemented. The four charging stages are trickle, bulk, absorption and float. The trickle stage safely charges overly discharged batteries. It protects a damaged or shorted battery from excessive current. During bulk charge a constant current is applied to quickly restore the maximum battery charge level in the shortest amount of time. The absorption stage applies a constant voltage to the battery to bring the battery to 100% capacity. The float stage tailors the constant voltage output to maintain the battery at full capacity while serving DC operated loads.

An optional temperature sensor may be used to adjust charging rate based on internal battery temperature in the absorption and float stages. Use of a battery temperature sensor helps to increase battery life by preventing over or under charging of the battery. The battery temperature sensor also protects the battery from overheating. Temperature compensation is recommended in all applications, but is particularly valuable for generator sets in outdoor applications.

Battery chargers are field-configurable for charging either 12 or 24 VDC battery systems and for operation at 50 or 60 Hz. Output voltage and battery type selection is done through the alphanumeric display.

Features

Protection - All models include a 20 amp DC output breaker. Re-settable breakers are used for input voltages 240 VAC and lower. For over 240 VAC branch circuit rated fuses are used.

Easy installation - Clearly marked terminal blocks and panel knockouts provide convenient connections of input and output leads.

User display - Output voltage and current, fault information and configuration options are indicated on the alphanumeric display.

Monitoring - An LED indicates the condition of the charger. Green indicates normal charging operation, amber indicates equalizing and red indicates a fault condition.

Adjustable float voltage – Float voltage can be set through the alpha-numeric display for optimum battery performance and life.

Temperature compensation - An optional external sensor is available for temperature compensated battery charging.

Faults - The charger senses and annunciates the following fault conditions: Input overvoltage, input undervoltage, AC power loss, battery overvoltage, battery undervoltage, charger circuitry over temperature, battery over temperature, unrecoverable battery and overload/overcurrent. Includes 30 volt/2 amp isolated contact for common alarm.

Parallel redundant operation - Chargers can be operated in parallel for redundant reliability or additional charging capacity.

Vibration resistant design - complies with UL 991 vibration resistance requirements.

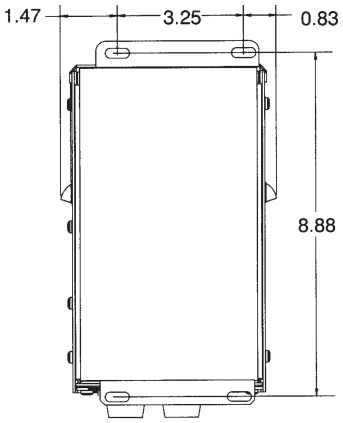
UL 1236 (BBHH) Listing - for use with lead acid batteries in generator set installations. Also suitable for use with NiCad, gel and AGM batteries.

Specifications

Performance and physical characteristics

Output:	Nominal voltage	12 or 24 VDC
	Float voltage – 12 V batteries	12.8, 13.0, 13.3, 13.5, 13.6, 14.3
	Float voltage – 24 V batteries	25.7, 26.1, 26.6, 27.0, 27.2, 28.6
	Equalize-voltage	15.5 or 31.0 VDC
	Output voltage regulation	±1%
	Maximum output current	15 A @ 12 VDC or 12 A @ 24 VDC
	Equalize charger time	0-12 hrs
Input:	Voltage AC	120, 208, 240, 277, 380, 416, 480, 600
	Frequency	50 or 60 Hz
Approximate net weights:		11.6 lbs (5.3 Kg)
Approximate dimensions: height x width x depth - in (mm)		9.75 x 5.56 x 6.14 (248 x 141 x 156)
Ambient temperature operation:		-22 °F to 122 °F (-30 °C to 50 °C)

Input volts	Genset kit part number	ATS kit part number
120/208/240	0300-5878-01	0300-5878-13
277	0300-5878-02	0300-5878-14
380	0300-5878-03	0300-5878-15
416	0300-5878-04	0300-5878-16
480	0300-5878-05	0300-5878-17
600	0300-5878-06	0300-5878-18
Temperature sensor kit	0541-0918	0541-0918



Mounting dimensions – inches
Bottom view

Enclosure

The NEMA 1, corrosion resistant, aluminum enclosure is designed for wall mounting. When wall mounted, louvers protect cooling holes in the sides of the enclosure. Use 1/4 in (6.35 mm) diameter bolts for mounting.

RFI/EMI and voltage surge compliance

Charger complies with the requirements of EN61000-4-5 for voltage surge resistance, EN50082-2 (heavy industrial) for immunity, EN61000-4-2 for ESD, EN61000-4-3 for radiated immunity, ANSI/IEEE C62.41 Category B & EN 61000-4-4 for electrically fast transient, EN61000-4-6 for conducted, and FCC Part 15 Class A for emissions.

Americas
1400 73rd Avenue N.E.
Minneapolis, MN 55432 USA
Phone: 763 574 5000
Fax: 763 574 5298

Europe, CIS, Middle East and Africa
Manston Park Columbus Ave.
Manston Ramsgate
Kent CT 12 5BF United Kingdom
Phone 44 1843 255000
Fax 44 1843 255902

Asia Pacific
10 Toh Guan Road #07-01
TT International Tradepark
Singapore 608838
Phone 65 6417 2388
Fax 65 6417 2399

Warning: Back feed to a utility system can cause electrocution and/or property damage. Do not connect generator sets to any building electrical system except through an approved device or after building main switch is open.

Warning: For professional use only. Must be installed by a qualified service technician. Improper installation presents hazards of electrical shock and improper operation, resulting in severe personal injury and/or property damage.

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www.cumminspower.com

Specification sheet

Ships Loose for Others to Install

PowerCommand® annunciator discrete input or PCCNet

Description

The Universal Annunciator Module provides visual and audible indication of up to 20 separate alarm or status conditions, based on discrete (relay) inputs or network inputs. Each LED can be controlled by either a discrete wire input or by a signal on the PCCNet network sent from an external device, such as a PCC1301 or PCC2100 (version 2.4 or later) control.

In addition to the LEDs, the annunciator can control four custom relays based on signals received over the PCCNet. When one of the annunciator's discrete inputs is activated, the annunciator will broadcast that information over the network. By taking advantage of the network, discrete inputs and custom relays, the annunciator can be used as expanded I/O for a genset controller.

Easily installed in a location to give immediate notification of an alarm or warning status. Designed to give operating/monitoring personnel quick-glance status information. The module directly senses battery voltage to provide green/yellow/red alarm and status information for that parameter.

Genset controller complies with NFPA level two requirements when used with the display but without the annunciator panel. When used with the annunciator it meets NFPA level one requirements (Emergency and Standby power systems). The annunciator module can also be used for monitoring of transfer switch or other equipment status.

Features

- Visual and audible warnings of up to 20 separate alarm or status conditions.
- LEDs can be controlled either via PCCNet or discrete input.
- Status of discrete inputs is broadcast on network.
- Four custom relays can be controlled over the PCCNet network.
- Configurable LED color (red, yellow or green) and selectable horn operation allows maximum flexibility.
- Standard NFPA 110 label, field configurable for other alarm status and conditions.
- Each audible alarm is annunciated, regardless of the number of existing alarm conditions displayed.
- Sealed membrane panel design provides environmental protection for internal components and is easy to clean.
- Configurable for negative (ground) input or positive input.
- Integral DC voltage sensing.
- Flush or surface mount provisions.
- UL Listed and labeled; CSA certified; CE and UKCA marked.

Specifications

Signal requirements

Positive - Input impedance is 1.82 kOhms to ground; maximum input voltage = 31 VDC.

Negative - Input impedance is 1.82 kOhms to Bat+: inputs are at Bat+ level when open.

Sink/source current threshold for detection - 150 Ua minimum, 3 mA maximum.

Typical conductor size: 16 ga for 304.8 m (1000 ft)

Max conductor size for terminal: 12 ga

Relay outputs

0.2 A at 125 VAC and 1 A at 30 VDC

Network connections

Use Belden 9729 two pair, stranded, shielded 24 AWG twisted pair cable for all PCCNet connections. Total network length cannot exceed 1219 m (4000 ft). Up to 20 nodes can be connected to the network.

Note: Any communications wire connected to the generator set should be stranded cable.

Power

Maximum consumption: 15 watts

Battery voltage

Functional range - Audible and visual conditions operational from 6.5 to 31 VDC.

Low voltage setting - 12.0 VDC for 12 Volt nominal systems; 24.0 for 24 Volt nominal systems.

High voltage setting - 16.0 Volt for 12 Volt nominal systems; 32.0 Volt for 24 Volt nominal systems.

Alarm horn

Sound level: 90 dB at 30 cm

Physical

Weight (with enclosure): 1.4 kg (3.0 lbs)

Temperature

-20 °C to +70 °C (-4 °F to +158 °F)

Humidity

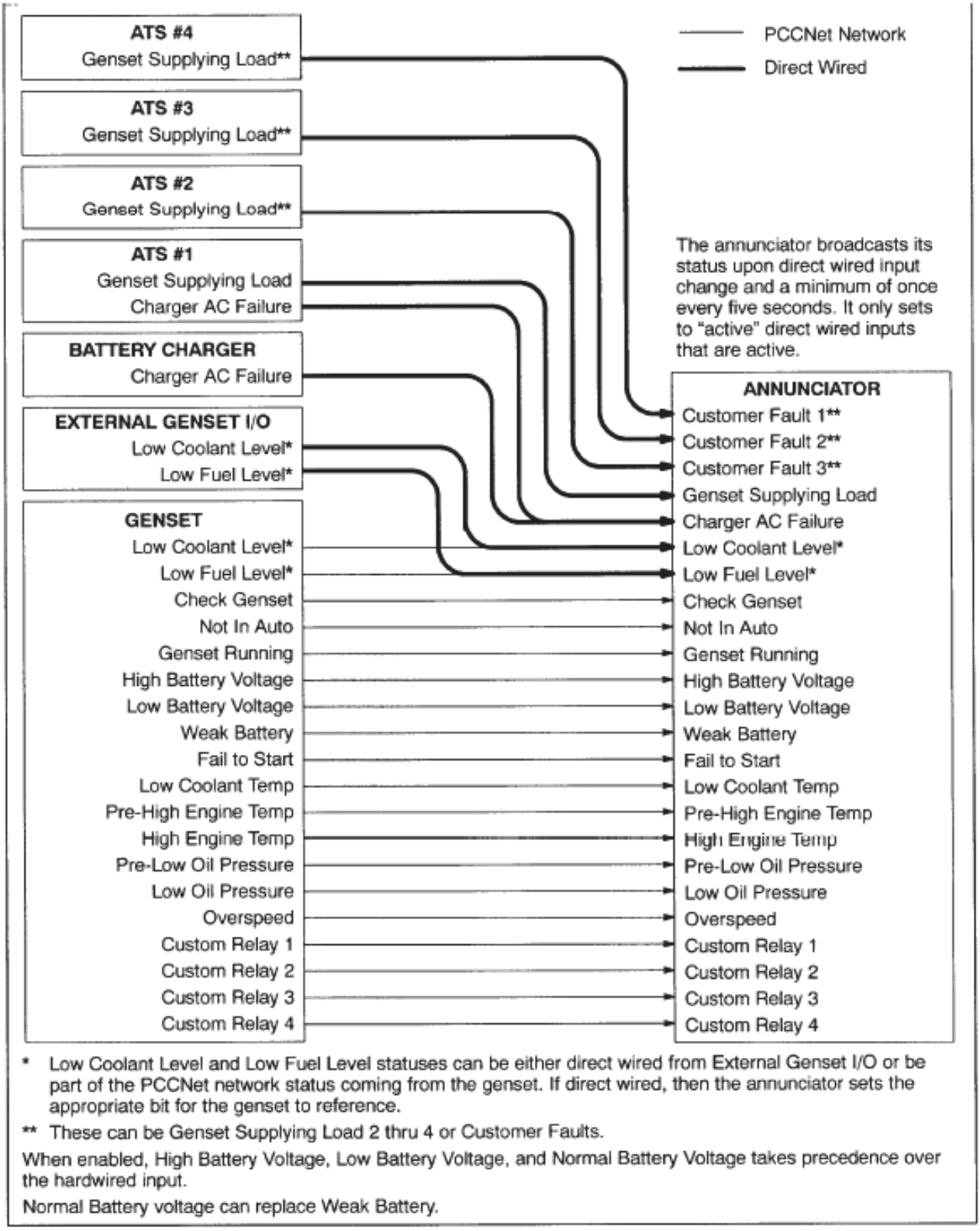
10% to 95% RH (non-condensing)

Default lamp configurations

Can be configured for current NFPA 110 standard or as a replacement for Legacy (pre-2001) NFPA 110 annunciator (300-4510 or 300 4511)

		NFPA 110		
Lamp	**Description**	**Color**	**Horn**	**Flash**
DS1	Customer fault 1	Green	No	No
DS2	Customer fault 2	Amber	No	No
DS3	Customer fault 3	Red	No	No
DS4	Genset supplying load	Amber	No	No
DS5	Charger AC failure	Amber	Yes	No
DS6	Low coolant level	Amber	Yes	No
DS7	Low fuel level	Red	Yes	No
DS8	Check generator set	Amber	No	No
DS9	Not in auto	Red	Yes	Yes
DS10	Generator set running	Amber	No	No
DS11	High battery voltage	Amber	Yes	No
DS12	Low battery voltage	Red	Yes	No
DS13	Weak battery	Red	Yes	No
DS14	Fail to start	Red	Yes	No
DS15	Low coolant temp	Red	Yes	No
DS16	Pre-high engine temp	Amber	Yes	No
DS17	High engine temp	Red	Yes	No
DS18	Pre-low oil pressure	Red	Yes	No
DS19	Low oil pressure	Red	Yes	No
DS20	Overspeed	Red	Yes	No

Typical installation



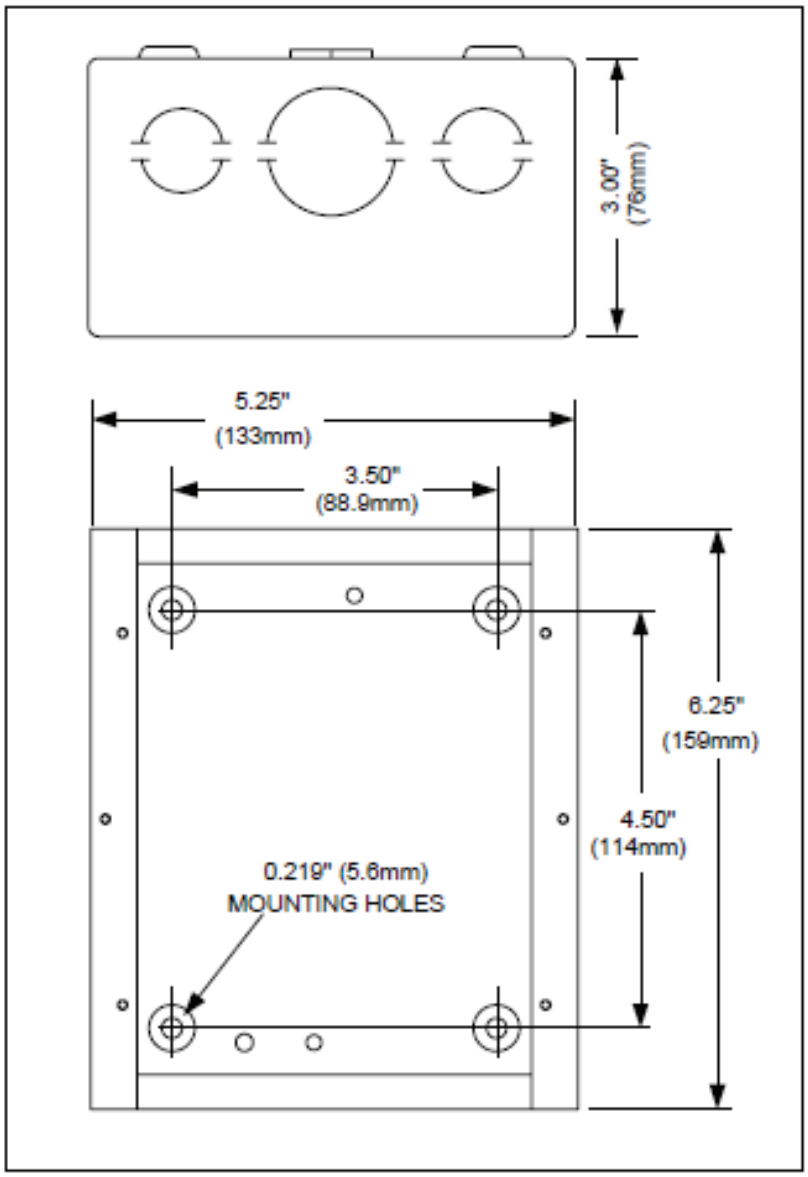
* Low Coolant Level and Low Fuel Level statuses can be either direct wired from External Genset I/O or be part of the PCCNet network status coming from the genset. If direct wired, then the annunciator sets the appropriate bit for the genset to reference.

** These can be Genset Supplying Load 2 thru 4 or Customer Faults.

When enabled, High Battery Voltage, Low Battery Voltage, and Normal Battery Voltage takes precedence over the hardwired input.

Normal Battery voltage can replace Weak Battery.

Dimensions



Dimensions: in (mm)

Ordering information

Part number	Description
0300-5929-01	Panel mount
0300-5929-02	Panel with enclosure

For more information contact your local Cummins distributor or visit power.cummins.com

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S-1472 (02/22)

Commercial Standby Extended Warranty Statements

Performance you rely on.™

Commercial Standby Extended Warranty Statements

English – Original Instructions 5–2012 A042V549 (Issue 1)

Limited Standby 5 Year or 2,500 Hour Parts + Labor + Travel Extended Warranty – L189

Commercial Generating Set

When purchased, this limited extended warranty applies to all Cummins Power Generation® branded commercial generating sets and associated accessories (hereinafter referred to as "Product").

This warranty covers any failures of the Product, under normal use and service, which result from a defect in material or factory workmanship.

Warranty Period:

The warranty start date is the date of initial start up, first rental, demonstration or 18 months after factory ship date, whichever is sooner. The coverage duration is 5 years from warranty start date or 2,500 hours, whichever occurs first.

Emergency Standby Power (ESP) is defined as the maximum power available during a variable electrical power sequence, under the stated operating conditions, for which a generating set is capable of delivering in the event of a utility power outage. The permissible average power output over 24 hours of operation shall not exceed 70% of the ESP.

Cummins Power Generation® Responsibilities:

In the event of a failure of the Product during the extended warranty period due to defects in material or workmanship, Cummins Power Generation® will only be responsible for the following costs:

- All parts and labor required to repair the Product.
- Reasonable travel expenses to and from the Product site location.
- Maintenance items that are contaminated or damaged by a warrantable failure.

Owner Responsibilities:

The owner will be responsible for the following:

- Notifying Cummins Power Generation® distributor or dealer within 30 days of the discovery of failure.
- Installing, operating, commissioning and maintaining the Product in accordance with Cummins Power Generation®'s published policies and guidelines.
- Providing evidence for date of commissioning.
- Providing sufficient access to and reasonable ability to remove the Product from the installation in the event of a warrantable failure.

In addition, the owner will be responsible for:

- Incremental costs and expenses associated with Product removal and reinstallation resulting from non-standard installations.
- Costs associated with rental of generating sets used to replace the Product being repaired.
- Costs associated with labor overtime and premium shipping requested by the owner.
- All downtime expenses, fines, all applicable taxes, and other losses resulting from a warrantable failure.

Limitations:

This limited extended warranty does not cover Product failures resulting from:

- Inappropriate use relative to designated power rating.
- Inappropriate use relative to application guidelines.
- Failures due to normal wear, corrosion, varnished fuel system parts, lack of reasonable and necessary maintenance, unauthorized modifications and/or repair, and use of add-on or modified parts.
- Improper and/or unauthorized installation.
- Owner's or operator's negligence, accidents or misuse.
- Noncompliance with any Cummins Power Generation® published guideline or policy.
- Use of improper or contaminated fuels, coolants or lubricants.
- Improper storage before and after commissioning.
- Owner's delay in making Product available after notification of potential Product problem.
- Replacement parts and accessories not authorized by Cummins Power Generation®.
- Use of Battle Short Mode

Limitations Continued:

- Owner or operator abuse or neglect such as: operation without adequate coolant or lubricants; overfueling; overspeeding; lack of maintenance to lubricating, cooling or air intake systems; late servicing and maintenance; improper storage, starting, warm-up, run-in or shutdown practices, or for progressive damage resulting from a defective shutdown or warning device.
- Damage to parts, fixtures, housings, attachments and accessory items that are not part of the generating set.

This limited extended warranty does not cover costs resulting from:

- Difficulty in gaining access to the Product.
- Damage to customer property.
- Repair of cosmetic damage to enclosures.

Items not covered by this limited extended warranty:

- Batteries
- Enclosures
- Coolant heaters
- Exhaust systems and aftertreatment components
- Maintenance items

www.power.cummins.com

CUMMINS POWER GENERATION® RIGHT TO FAILED COMPONENTS:

Failed components claimed under warranty remain the property of Cummins Power Generation®. Cummins Power Generation® has the right to reclaim any failed component that has been replaced under warranty.

THE WARRANTIES SET FORTH HEREIN ARE THE SOLE WARRANTIES MADE BY CUMMINS POWER GENERATION ® IN REGARD TO THE PRODUCT. CUMMINS POWER GENERATION® MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, OR OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

IN NO EVENT IS CUMMINS POWER GENERATION® LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

This limited extended warranty shall be enforced to the maximum extent permitted by applicable law. This limited extended warranty gives the owner specific rights that may vary from state to state or from jurisdiction to jurisdiction.

Product Model Number:_____

Product Serial Number:_____

Date in Service:_____