

Scope of Services
Compaction Testing, Soils Investigations,
Drilling and Well Construction

SCHEDULE A

- (1) The Contractor shall provide qualified personnel to test and inspect the quality and placement of fill materials on the projects specified by the Engineer within eighteen (18) hours of notice. Tests and inspections shall include, but not be limited to, laboratory compaction tests, field density tests, moisture content determinations, percent compaction, types and gradations of the materials, and placement of the fill materials. The Contractor shall have control of and responsibility for the fill material, being empowered to reject any fill material failing to be suitable for the area placed, either for reasons of compaction or quality of materials.
- (2) The Contractor shall provide qualified personnel to provide on-site soil investigations to inventory the existing soil conditions and determine the general suitability of the soils encountered for the intended purposes. These investigations may be made by means of test pits, soil borings performed by hand augers or machine drills, or by continuous tube sampling with a three (3) inch diameter tube. The method will be determined by the City and the Contractor acting in conjunction based on the existing field conditions for the location being investigated. These investigations shall include, but not be limited to, soil classifications and boring logs, groundwater conditions, and those laboratory tests required to determine the suitability of the materials encountered for the intended purposes.
- (3) The Contractor shall provide qualified personnel and equipment to perform exploratory borings and to install groundwater, leachate, and gas monitoring wells. Services shall include but not be limited to, soil boring, well drilling, sediment/bedrock sampling, field and laboratory analyses, well installation, well development, and borehole/well abandonment. Boring/well locations, depths, and dimensions will be determined by the City. Proposed drilling locations could exist within areas exhibiting contamination (e.g., landfills and LUST sites). All well installation and abandonment activities shall be conducted per Ch. NR 141 of the Wisconsin Administrative Code. The Contractor shall be responsible for contacting the Digger's Hotline "One Call" system in advance of drilling at a proposed site to verify the location of underground utilities. Under the City's direction, the contractor shall remove and dispose of all drill cuttings and shall be responsible for site restoration.
- (4) The Contractor shall provide qualified personnel to obtain and analyze creek or lake sediment cores. The sediment cores shall be taken where directed by the City Engineer. "Shallow water sediment cores" shall include water five (5) feet deep or less. "Deep water sediment cores" shall include water greater than five (5) feet deep. The sediment cores shall have a minimum diameter of 10 cm. Core depths shall be determined for each specific site depending on the actual sediment depth. Cores shall be divided as directed by the City Engineer and each division (i.e., 12" increment, halves, thirds, etc.) shall be analyzed independently and shall constitute a lab analysis. These samples shall be analyzed for any combination of the constituents listed on the following page. Elutriate[TLCP] testing may be required for all chemicals listed. A second column has been provided for listing of prices for elutriate testing. Payments for each analysis being the sum of listed prices for all constituents analyzed. Tests performed on these cores shall be in compliance with Ch. NR 149 of the Wisconsin Administration code.

- (5) The Contractor shall provide field and laboratory testing facilities required to perform the tests and inspections.
- (6) The Contractor shall make those inspections and perform those tests at those locations and at those times as directed by the City Engineer.
- (7) The Contractor shall invoice the City Engineer on a monthly basis for services performed. A separate invoice shall be submitted for each project for which services were performed on, and the invoice shall describe the project name and City contract numbering, the date the services were performed, the hours for each of the Contractor's employees and their respective rates, and the number and description of reimbursable test.

Such payments shall be full compensation for services rendered and for all labor, materials, supplies, equipment and incidentals necessary to complete the services rendered.

There shall be no charge for mileage to and from projects other than drill rig mobilization.

- (8) The Contractor shall provide the services described in this contract at the following rates:
 - (a) General.

Laboratory Technician	No charge	per Hour
Field Technician	\$29-54	per Hour
Field Engineer	\$68-77	per Hour
Professional Engineer	\$87-99	per Hour

Note: The above rates apply to the position and services performed regardless of the status of classification of the person performing the services.

- (b) Equipment for Compaction Testing

9.00

 per Field Density Test

- (c) Soil Investigations and Monitoring Well/Probe Installations.

Drilling Rig Mobilization		
Truck Mounted	290.00	Each
Track Mounted	330.00	Extra
Equipment Decontamination (when required)	200.00	Day
Traffic Control – Signs	110.00	Day
Standard Soil Borings (ASTM D 1586)		
0' – 10' No Bentonite Backfill	13.00	V.F.
0' – 20' Bentonite Backfill	16.00	V.F.
20' – 40' Bentonite Backfill	17.00	V.F.
Casing for Rotary Drilling	7.00	V.F.
Additional Split Spoon Sample	25.00	
Machine Auger Borings		
No Bentonite Backfill	10.50	V.F.
Bentonite Backfill	14.00	V.F.
Asphalt Patch Borehole	25.00	Each
Concrete Patch Borehole	30.00	Each
Continuous Tube Sampling, 3" Tube	130.00	Five Ft. of Depth
	260.00	Ten Ft. of Depth

Drill Concrete Pavement in Excess of 4" Thickness	50.00	Test Hole
Direct Push Sampling		
0' – 20' Depth	11.50	L.F.
20' – 40' Depth	11.50	L.F.
Water Sample Collection (peristaltic)	40.00	Each
Shallow Water Sediment Cores	300.00	V.F.
Deep Water Sediment Cores:		
5'-10' Depth	375.00	V.F.
10'-20' Depth	450.00	V.F.
20'-30' Depth	500.00	V.F.
Monitoring Well/Probe Installation		
Boring (2.25" I.D. Auger), 0' - 40' Depth	13.00	L.F.
Boring (3.25" I.D. Auger), 0' - 40' Depth	14.50	L.F.
Boring (6.25" I.D. Auger), 0' - 40' Depth	17.50	L.F.
Boring (6.25" I.D. Auger), 40' - 80' Depth	20.00	L.F.
Boring (6.25" I.D. Auger), 80' - 120' Depth	26.50	L.F.
Boring (8.25" I.D. Auger), 0' - 40' Depth	32.50	L.F.
Generator	60.00	Day
Rock Drilling - Air Rotary (6-inch dia.)	33.00	L.F.
Air Compressor - Air Rotary (750 cfm)	375.00	Day
Rock Drilling - Casing/Mud (6-inch dia.)	30.00	L.F.
1.0 Inch Schedule 40 PVC Well Casing, incl. installation and backfill	16.00	L.F.
2.5 Inch Schedule 40 PVC Well Casing, incl. installation and backfill	16.00	L.F.
2.5 Inch Schedule 80 PVC Well Casing, incl. installation and backfill	20.00	L.F.
6.0 Inch Schedule 80 PVC Well Casing, incl. installation and backfill	48.00	L.F.
Sand and Bentonite (Various Gradation)	11.00	Bag
Protective Casing (6" Aluminum) (w/ cap)	200.00	Each
Protective Casing (10" Steel) (w/ cap)	250.00	Each
Protective Casing (PVC Flush Mount)	70.00	Each
Well Development	75.00	Hour
Water Haul	120.00	Each
Soil Classification and WDNR Logs	11.00	Each
Hydraulic Conductivity Testing (Well Slug Test)	165.00	Hour
Rock Coring	48.00	L.F.
Well Repair Crew/Standby	175.00	Hour
Well Repair Parts (fill in the % charge)	5.00	Cost plus %

(d) Laboratory Tests

Atterberg Limits	55.00	per Set
Wash and Dry Sieve Analysis	50.00	Each
Unconfined Compressive Strength	50.00	Each
Wet and Dry Densities	25.00	Each
Loss on Ignition	30.00	Each
Natural Moisture Content	5.00	Each

Particle size distribution by hydrometer (with curve)	99.00	per Sample
Hydraulic conductivity by falling head method	175.00	per Sample
Hydraulic conductivity by ASTM D 5084	400.00	per Sample
Optimum Moisture/Maximum Density Test Curve (Check Point Curve)		
Clay Soils	50.00	per Sample
Granular Soils	50.00	per Sample
Optimum Moisture/Maximum Density Test Curve (3-point Proctor)		
Clay Soils	150.00	per Sample
Granular Soils	150.00	per Sample

(e) Sampling Equipment

2-inch diameter Shelby tubes, 30-inches long, with end caps	53.00	Each
2-inch diameter Shelby tubes, 36-inches long, with end caps	53.00	Each
3-inch diameter Shelby tubes, 12-inches long, with end caps	48.00	Each
3-inch diameter Shelby tubes, 18-inches long, with end caps	50.00	Each
3-inch diameter Shelby tubes, 24-inches long, with end caps	53.00	Each
3-inch diameter Shelby tubes, 30-inches long, with end caps	60.00	Each
3-inch diameter Shelby tubes, 36-inches long, with end caps	60.00	Each
Chipped bentonite, 50-pound bags	11.00	per Bag
Granular bentonite, 50-pound bags	11.00	per Bag

(f) Core/Soil Analysis (Lab costs exclusive of personnel). There shall be no additional charge for laboratory equipment required to perform the services rendered, other than those listed below. Prices below are for standard ten (10) working day turnaround. Premium charge for 24 hour turnaround shall increase the below cost by three times, premium charge for 2 to 3 working day turnaround shall increase the below cost by two times, premium charge for 4 to 5 working day turnaround shall increase the below cost by 1.5 times. Note that turnaround times begin *when the samples arrive at the laboratory.*

Chemical/Parameter	Minimum Soil Limit of Detection (mg/kg)	Proposed Method	Soil Sample Test Cost	TCLP Elutriate Test Cost
Metals				
Arsenic, total	0.039	EPA 6010	\$13	\$13
Barium	5500	EPA 6010	\$13	\$13
Cadmium, total	8	EPA 6010	\$13	\$13
Chromium, total	14	EPA 6010	\$13	\$13

Chemical/Parameter	Minimum Soil Limit of Detection (mg/kg)	Proposed Method	Soil Sample Test Cost	TCLP Elutriate Test Cost
Chromium, hexavalent	14	EPA 7196	\$60	XXXX
Copper, total	14	EPA 6010	\$13	\$13
Lead, total	50	EPA 6010	\$13	\$13
Manganese, total	50	EP1 6010	\$13	\$13
Mercury, total	4.7	EPA 7471	\$32	\$32
Nickel, total	310	EPA 6010	\$13	\$13
Selenium, total	78	EPA 6010	\$13	\$13
Zinc, total	2300	EPA 6010	\$13	\$13
Nutrients				
Nitrogen, Ammonia	--	EPA 350.1	\$104 ⁺	XXXX
Nitrogen, Kjeldahl, Total	7800	EPA 351.2	\$104 ⁺	XXXX
Nitrogen, NO2 plus NO3	--	EPA 351.3	\$104 ⁺	XXXX
Phosphorus	1.6	EPA 365.4	\$28	XXXX
*Nitrogen tests performed as group				
Polycyclic Aromatic Hydrocarbons				
1-Methylnaphthalene	8.8	EPA 8270 SIM	\$105	\$105
2-Methylnaphthalene	8.8			
Acenaphthene	900			
Acenaphthylene	8.8			
Anthracene	5000			
Benzo(a)anthracene	0.088			
Benzo(a)pyrene	0.0088			
Benzo(b)fluoranthene	0.088			
Benzo(g,h,i)perylene	0.88			
Benzo(k)fluoranthene	0.88			
Chrysene	8.8			
Dibenzo(a,h)anthracene	0.0088			
Fluoranthene	600			
Fluorene	600			
Indeno(1,2,3-cd)pyrene	0.088			
Naphthalene	600			
Phenanthrene	0.88			
Pyrene	500			
Organic Compounds				
Full VOC Scan*	--	EPA 8260	\$88	\$88
Benzene	0.0055		\$33	\$33
1,2-Dichloroethane	0.0049			
Ethylbenzene	2.9			
Toluene	1.5			
Xylenes, Total	4.1			
DRO	100	WI 8015	\$40	XXXX
GRO	100	WI 8021	\$31	XXXX

Chemical/Parameter	Minimum Soil Limit of Detection (mg/kg)	Proposed Method	Soil Sample Test Cost	TCLP Elutriate Test Cost
Hexane Extractable Material (Oil and Grease)	--		\$66	X
Pesticides				
Aldrin	0.38	EPA 8081	\$155	\$155
Dieldrin	0.04			
Endrin	23			
Heptachlor	0.14			
Lindane	--			
Toxaphene	0.58			
Trans-Chlordane	0.49			
Cis-Chlordane	0.49			
o,p-DDT	1.9			
p,p-DDT	1.9			
o,p-DDD	1.9			
p,p-DDD	1.9			
o,p-DDE	1.9			
p,p-DDE	1.9			
Miscellaneous				
Total Cyanide	--	EPA 9012	\$42	\$13
PCBs, Total	0.1	EPA 8082	\$143	\$143
pH	--	EPA 9045	\$12	X
Total Organic Carbon	--	EPA 9060	\$66	X
Electrical Conductivity	--	EPA 9050	\$20	X
Fecal Coliform	--	SM 9222D	\$32	X

*Detection limits for VOCs in soils and water shall meet industry standards.

Note: Protocol B (attached) to be invoiced as lump sum of \$860.00.

SUMMARY OF SITE SPECIFIC ACCEPTANCE LIMITS

PROTOCOL B

<u>PROTOCOL</u>	<u>ACCEPTANCE LIMITS</u>
pH	2.0 ≤ pH ≤ 12.5
Specific Gravity	no limit
Total Solids	no limit
Free Liquids	0% free liquids (paint filter test)
Flash Point	≥ 140° F
Arsenic	TCLP extraction procedure < 5.0 mg/l
Barium	TCLP extraction procedure < 100.0 mg/l
Cadmium	TCLP extraction procedure < 1.0 mg/l
Chromium	TCLP extraction procedure < 5.0 mg/l
Copper	TCLP extraction procedure < 100.0 mg/l
Lead	TCLP extraction procedure < 5.0 mg/l
Mercury	TCLP extraction procedure < 0.2 mg/l
Nickel	TCLP extraction procedure < 35.0 mg/l
Selenium	TCLP extraction procedure < 1.0 mg/l
Silver	TCLP extraction procedure < 5.0 mg/l
Zinc	TCLP extraction procedure < 200.0 mg/l
Reactive Sulfide	200 ppm
PCB's	< 50 ppm
Phenol	TCLP extraction procedure < 2000 mg/l
Reactive Cyanide	200 ppm
Benzene	TCLP extraction procedure < 0.5 mg/l
Carbon Tetrachloride	TCLP extraction procedure < 0.5 mg/l
Chlorobenzene	TCLP extraction procedure < 100.0 mg/l
Chloroform	TCLP extraction procedure < 6.0 mg/l
o-Cresol	TCLP extraction procedure < 200.0 ² mg/l
m-Cresol	TCLP extraction procedure < 200.0 ² mg/l
p-Cresol	TCLP extraction procedure < 200.0 ² mg/l
1,4-Dichlorobenzene	TCLP extraction procedure < 7.5 mg/l
1,2-Dichloroethane	TCLP extraction procedure < 0.5 mg/l
1,1-Dichloroethylene	TCLP extraction procedure < 0.7 mg/l
2,4-Dinitrotoluene	TCLP extraction procedure < 0.13 ¹ mg/l
Hexachlorobenzene	TCLP extraction procedure < 0.13 ¹ mg/l
Hexachloro-1.3-butadiene	TCLP extraction procedure < 0.5 mg/l
Hexachloroethane	TCLP extraction procedure < 3.0 mg/l
Methyl Ethyl Ketone	TCLP extraction procedure < 200.0 mg/l
Nitrobenzene	TCLP extraction procedure < 2.0 mg/l
Pentachlorophenol	TCLP extraction procedure < 100.0 mg/l
Pyridine	TCLP extraction procedure < 5.0 ¹ mg/l
Tetrachloroethylene	TCLP extraction procedure < 0.7 mg/l
Trichloroethylene	TCLP extraction procedure < 0.5 mg/l
2,4,5-Trichlorophenol	TCLP extraction procedure < 400.0 mg/l
2,4,6-Trichlorophenol	TCLP extraction procedure < 2.0 mg/l
Vinyl Chloride	TCLP extraction procedure < 0.2 mg/l

¹ Quantitation limit is greater than the calculated regulatory level. The quantitation limit, therefore becomes the regulatory level.

² If o.m-, and p-Cresol concentrations cannot be differentiated, the total Cresol (D026) concentration is used. The regulatory level for total Cresol is 200 mg/l.

For all constituents which are identified as TCLP extraction, it is permissible to do a totals analysis (on wastes which contain 0% free liquids) instead of the extraction. If the totals analysis is not over 20 times the acceptance limit, no extraction is required.