

ENVIRONMENT COMMITTEE AGENDA

March 16, 2017 – North Conference Room

21630 11th Avenue South – Des Moines 98198

5:45P – 6:50P

1. Approval of the minutes of the 1.19.2017 meeting

2. Barnes Creek Culvert Replacement Update (Informational Item – 20 min)
Staff will provide an update to the current status of the project.

3. Municipal Storage Yard Stormwater BMP Improvement Plan (Discussion Item – 25 min)
Staff will be briefing the Committee on the proposed Scope of Work for preparing a facility plan for both the Public Works Service Center and the Public Works Maintenance Shop sites.

4. Public Works Yard Groundwater Remediation Update (Informational Item – 20 min)
Staff will provide an update to the ongoing groundwater remediation occurring at the Public Works Yard (Maintenance Shop) and review the consultant contract proposal for continuing the remediation.

DRAFT MINUTES - ENVIRONMENTAL COUNCIL COMMITTEE MEETING 1.19.2017

The meeting was called to order @ 5:30 PM, Thursday, January 19, 2016, in the North Conference room @ 21630 11th Avenue South, Des Moines with the following in attendance:

Council Members

Robert Back, Chair

Melissa Musser

Matt Pina

Lakehaven Water & Sewer District

John Bowman – General Manager

Tim Osborne – Dev Engineering Manager

City Staff

Loren Reinhold, SWM Utility Manager

Brandon Carver, Engineering Svc Manager

Dan Brewer, Chief Operations Officer

Matt Hutchins, Asst City Attorney

Peggy Volin, Admin Asst II

AGENDA:

1. Approve minutes of the 11.17.2016 meeting
2. NPDES Permit Issues at Public Works Service Center
3. Confirmation of 2017 Work Program
4. Lakehaven Utility District Comprehensive Sewer Plan
5. Sound Ridge Condominium Groundwater Runoff

MEETING:

1. Approve the minutes of the November 17, 2016 meeting: Unanimously approved.
2. NPDES Permit Issues at Public Works Service Center: Chief Operations Officer Dan Brewer gave the Committee a brief history the Public Works Service Center located at 2255 S 223rd Street and the Summary of Findings from the Department Ecology's 12/7/2016 inspection of the location. COO Brewer said immediate action requirements are to sweep & clean paved surfaces; stop equipment and vehicle washing; implement BMP's for scrap vehicles; cover and contain stockpiles materials; implement BMP's for the fuel station; and implement BMP's for stationary and portable storage tanks. The long term requirements include developing a plan and schedule for a covered wash pad plumbed to a sanitary sewer; develop a plan and schedule to construct, cover and containment pad and changes to the drainage system that serves the fuel island (either obtain approval to discharge to the sanitary sewer or install an oil water separator: and develop a plan and schedule for providing secondary containment for the de-icer tank. Consent to hire a consultant to develop a plan and schedule for meeting the long term requirements was given by Committee. Staff to present the scope and fee for the plan at the next available Committee meeting.

3. Confirmation of 2017 Work Program: Approval was given by Committee for the 2017 Work Program as presented.
4. Lakehaven Utility District Comprehensive Sewer Plan: SWM Engineering Manager Loren Reinhold introduced John Bowman, General Manager and Tim Osborne, Development Engineering Manager from Lakehaven Utility District. Tim Osborne briefly outlined the Comprehensive Plan to the Committee and went through the attached executive summary. Loren Reinhold, SWM Utility Manager, outlined the next steps as the City of Des Moines returning comments on the Comp Plan back to Lakehaven next week. Once all comments have been incorporated, staff will submit the final plan for Council adoption.
5. Sound Ridge Condominium Groundwater Runoff: SWM Engineering Manager Loren Reinhold briefed the Committee on the citizen concerns regarding the potential impacts of increased groundwater and surface water runoff should 16th Avenue S be extended north past the condominium to S 216th Street. He then went over the drainage in that area and potential mitigation measures that may be used to avoid impacts to Sound Ridge Condominiums.

Meeting adjourned at 6:50 pm

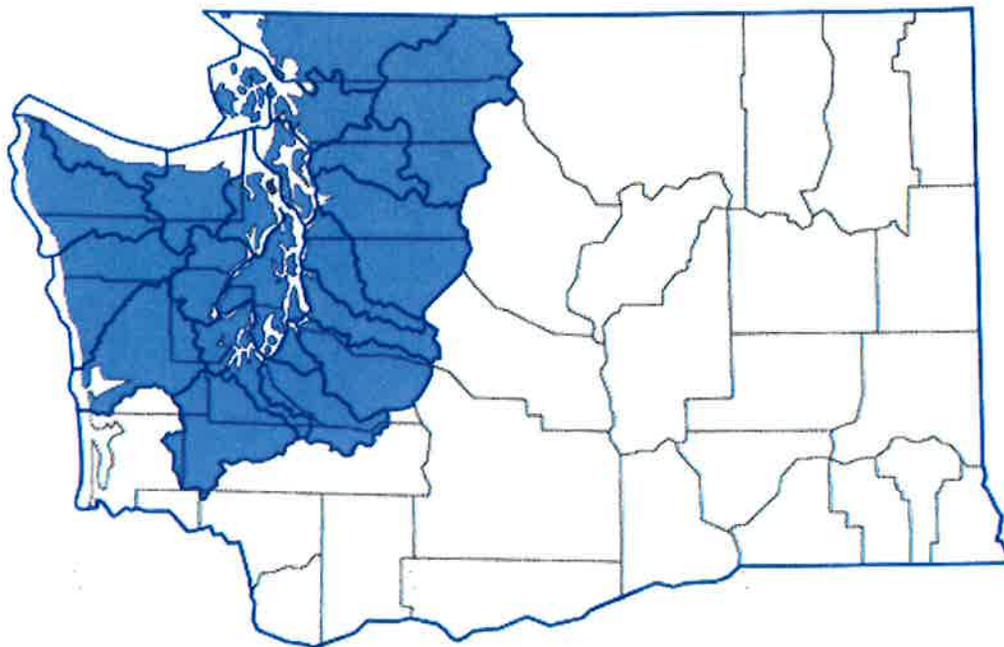
Minutes respectfully Submitted by: Peggy Volin, Admin Asst II



3.16.2017 EC Agenda Item #2

Federal Court Injunction Related to Fish Passage

Court injunction affected area in highlighted portion



WSDOT has been working for many years to remove fish passage barriers. Twenty-one northwest Washington tribes asked the U.S. District Court to find that the State of Washington has a treaty-based duty to preserve fish runs, and sought to compel the state to repair or replace culverts that impede salmon migration.

The court ruled in favor of the tribes and declared that the right of taking fish, secured to the tribes in the Stevens Treaties, imposes a duty upon the state to refrain from building or operating culverts under state-maintained roads that hinder fish passage and thereby reduce the number of fish that would otherwise be available for tribal harvest.

The court further declared that the State of Washington currently owns and operates culverts that violate this duty.

A federal court injunction, issued March 2013, requires the state to significantly increase the effort for removing state-owned culverts that block habitat for salmon and steelhead by 2030.

The U.S. District Court injunction affects:

- Washington State Department of Transportation
- Washington State Department of Natural Resources
- Washington State Department of Fish and Wildlife
- Washington State Parks and Recreation Commission

WSDOT has 996* culverts that apply to this injunction, with 825* of them having significant habitat.

* This number is subject to change as new information is collected regarding these culverts.

The injunction will require the state to maintain and monitor culverts for fish passage.

More details about the injunction can be found in the WSDOT Fish Barrier Correction: Moving Forward, Connection Habitat. (pdf 1 mb)



WSDOT Fish Barrier Correction:

MOVING FORWARD, CONNECTING HABITAT

SR 99 West Fork Hylebos Creek culvert replacement:



Hylebos Creek project — BEFORE

This culvert at the State Route 99 crossing of the West Fork Hylebos Creek was a barrier to fish passage because of high water velocities and an outfall drop that was too high for fish to jump.

Hylebos Creek project — AFTER

A new 70-foot high, 20-foot wide, 96-foot long box culvert was constructed in 2015 at a total project cost of \$3.7 million. The new culvert is designed to mimic a natural stream channel and properly sized to handle peak creek flows. It restored fish passage to 2 miles of upstream habitat for fish.

There are about 1,989 barriers to fish passage in the highway system statewide and 1,530 have significant habitat (more than 200 meters up-stream). Correcting fish passage barriers is an important part of the state's effort to protect and restore salmon runs and meet legal responsibilities. WSDOT has been correcting fish passage barriers since the early 1990's.

In the 2016 construction season, WSDOT corrected 20 additional fish passage barriers, improving access to more than 93 miles of stream habitat.

Funding increasing but more is needed

In the 2015-17 biennium, approximately \$88.7 million will be invested in stand-alone projects that correct fish passage barriers. In addition to these projects, other highway improvement projects will correct barriers within the boundaries of those projects.

In 2013, a U.S. District Court injunction was issued (part of the U.S. v. WA culverts case), requiring the state to correct hundreds of culverts in the western Washington "Case Area" by 2030.* In 2013, the estimate to correct barriers in the case area was \$2.4 billion.

*Refer to the back page of this publication for more information on the U.S. District Court case.

Making progress on removing barriers

To date, WSDOT has:

- Completed a total of 301 fish passage projects statewide.
- Improved access to about 1,000 miles of potential habitat upstream.



A barrier on State Route 307 at Dogfish Creek was replaced in 2016 with this stream simulation culvert.

Leveraging investments with partnerships

WSDOT is required to correct its fish passage barriers regardless of whether there are other fish passage barriers on the stream. For this reason, WSDOT seeks out opportunities to coordinate fish barrier corrections with partners to gain bigger benefits for fish habitat.

One example is near Poulsbo, on Dogfish Creek and its tributaries.

- Eight fish barriers have been corrected by WSDOT, the city of Poulsbo, Kitsap County and private landowners.
- Collectively, this improves access to about 10 miles of stream habitat.
- Most work started in the lower watershed and is working upstream. The city and county invested knowing the state was correcting its fish barriers.
- In 2016, WSDOT is correcting a barrier culvert crossing of Dogfish Creek on State Route 307 opening an additional 4.9 miles of habitat.

MORE INFORMATION

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Biology Branch Manager

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www.wsdot.wa.gov/Environment/Biology/FP/fishpassage



In 2015, a six-foot round culvert on Lake Creek was replaced with a bridge for \$2.5 million. This project located near Lake McMurray crossing State Route 9 provides coho salmon, steelhead, bull trout, searun cutthroat and resident trout access to 10 miles of upstream habitat.

'Culvert Case' background

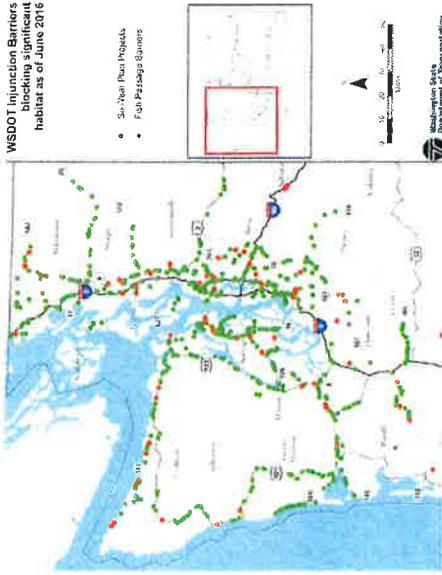
The State of Washington, the federal government and 21 tribes have been involved in litigation related to the 1974 Boldt Decision, involving the tribes' right to a "fair share" of the anadromous fish harvest.

In 2007, the U.S. District Court found in favor of the tribes and declared that the right secured to the tribes in the Stevens Treaties, imposes a duty upon the state to refrain from building or operating culverts under state-maintained roads that hinder fish passage and thereby diminish the number of fish that would otherwise be available for tribal harvest.

In 2013, the court issued an injunction that requires state agencies to correct barrier culverts. WSDOT-owned culverts that are subject to the injunction total over 800.

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Title VI Notice to Public: It is the Washington State Department of Transportation's (WSDOT) policy to assure that no person shall, on the grounds of race, color, national origin or sex, as provided by Title VI of the Civil Rights Act of 1964, be excluded from participation in, be denied the benefits of, or be otherwise discriminated against under any of its federally funded programs and activities. Any person who believes his/her Title VI protection has been violated, may file a complaint with WSDOT's Office of Equal Opportunity (OEO). For additional information regarding Title VI complaint procedures and/or information regarding our non-discrimination obligations, please contact OEO's Title VI Coordinator at (866) 705-7082.



WSDOT Injunction Barriers blocking significant habitat as of June 2016

- Six-Year Plan Projects
- Fish Passage Barriers

The court case applies to all Watershed Resource Inventory Areas (WRIA) in western Washington, with the exception of those that flow into the Columbia River and Willapa Bay. The watersheds covered by the court case are within the red box on the inset map.

WSDOT culverts in the federal case area

The dots above represent all 825 WSDOT-owned barriers that the 2013 federal injunction requires correcting by 2030. Red dots represent barriers that are funded and will be corrected in the next six years. Green dots represent remaining barrier culverts in the injunction case area requiring correction. For some of these, with smaller amounts of habitat upstream, replacement may be deferred until the end of useful life of the culvert.

Replacement culverts and bridges must span streams

To meet current standards for fish passage, barrier culverts must be removed and replaced with a bridge or a new culvert large enough to fully span the channel and simulate natural stream flow, gradient and bed configuration inside.

Funding

- In 2013-15, WSDOT spent approximately \$27 million correcting fish passage barriers.
- In 2015-17, WSDOT has \$88.7 million to spend on stand-alone fish passage projects.
- Our current general estimate for meeting the injunction is \$2.4 billion.
- Under current law, including the recent Connecting Washington funding, WSDOT has \$640 million allocated to fish passage through 2031. This level of funding helps address the largest habitat barriers and is estimated to improve access to 50 to 60 percent of the habitat currently blocked.



Juvenile coho salmon

Mobility for adult and juvenile fish

Young fish need passage as well as returning adults. Juvenile salmonids can spend up to two years rearing in freshwater before they migrate to the sea. During this time they need access to smaller stream and wetland areas where they can grow and evade predators.

Many culverts that are now barriers were built under former methods that did not reflect the current understanding of juvenile fish migration needs. Due to their smaller size, juvenile fish require more gentle conditions for migration than adult fish returning to spawn.

Bridges and "stream simulation" culverts allow for more natural channel conditions and better accommodate the needs of juvenile fish. Stream simulation refers to the design requirements intended to mimic natural conditions.



State Route 112 Coville Creek — BEFORE



State Route 112 Coville Creek — AFTER

Cost drivers in fish barrier correction projects

Replacing culverts under state highways comes at a higher cost than barrier correction under smaller roads. Costs associated with meeting the injunction requirements may include:

- Extensive excavation and grading of the channel to mimic a natural streambed.
- Construction staging to keep traffic moving with minimal disruption; projects cost more when roads are kept open during construction.
- Right of way agreements for access to adjacent property are often required for construction.
- Bridge design elements to meet standards for traffic load and seismic resiliency.
- Limited construction periods to adhere to in-water work restrictions.
- Public safety features including guardrail, barrier, striping and signing.



Constructing the fish passage structure at Little Creek on State Route 108

Efficiencies in fish barrier project design

WSDOT continuously works to reduce costs in design, contracting processes and construction duration, and to limit the impacts to highway users. Some of our methods include:

- Utilizing designated fish passage design teams to bring specialized expertise to these projects.
- Working with permitting agencies to streamline the permit process.
- Incorporating elements of practical design in fish barrier correction projects for efficiency and cost savings. The goal is to meet the need for the project and avoid making other improvements that are not essential, which leads to the lowest cost.
- Achieving efficiencies through structure design, bundling multiple projects in close proximity, using prefabricated elements and other design decisions.
- Coordinating traffic management strategies with stakeholders to minimize impacts to local communities and the traveling public during construction.
- Evaluating lessons learned at the end of each construction season.

Fish Passage Barrier Inventory

Fish Passage Inventory Updates

WDFW has inspected 7,167 water crossings along 7,056 mi of state highways. The initial inventory was completed in October of 2007, but reassessment of barriers and non-barriers is an ongoing effort. The inspected crossings included culverts as well as other features associated with WSDOT highways and rights of way, such as road fills, streambed controls, and dams.

- Of the 7,167 water crossings, 3,685 were identified as crossings over fish bearing waters.
- Approximately 54% (1,989) of the examined fish bearing crossings were identified as barriers (Table 4). Out of the 1,989* barriers, 963 are total barriers to fish passage, 1,020 provide partial fish passage, while six barriers have an unknown percent passability.
- One hundred and twenty-six crossings require further analysis to determine fish passage barrier status.

- Barriers with a significant habitat gain** (1,530) will be prioritized for correction with dedicated funding.
- Thirty-one fish passage barrier crossings require verification of significant habitat gain.

*The number of fish passage barriers is a dynamic value that changes as the on-going inventory takes place. As previously undetected culverts are inventoried, the number of crossings (and possibly fish passage barriers) may increase.

**A significant reach of habitat is defined as a section of stream having at least 200 linear meters of habitat without a natural barrier.

Table 4. Fish Passage Barriers Statewide

Fish-bearing Water Crossings	Fish Passage Barriers			Unknown Barrier Status	Barriers with Significant Habitat Gain	Barriers with Limited Habitat Gain ¹	Barriers with Habitat Threshold Gain Not Determined	Barriers Fixed ²
	Total Barriers (0% Passable)	Partial Barriers (33% or 67% Passable)	Percent Passable Unknown					
3,685	963	1,020	6	126	1,530	428	31	301

Based on WSDOT Fish Passage Inventory as of June 1, 2016.

¹ Barriers with less than 200 m potential habitat gain.

² Three hundred and one WSDOT fish passage barriers have been reported as replaced or retrofitted for fish passage; however, some of these require additional work to meet current fish passage criteria.

Regional Statistics

WSDOT has six geographic management regions: Northwest, North Central, Olympic, Southwest, South

Central, and Eastern (Figure 29). A summary of the fish passage barriers within the six regions is shown in Table 5. For a complete list of fish passage barriers refer to Appendix I.

Figure 29. WSDOT Regions

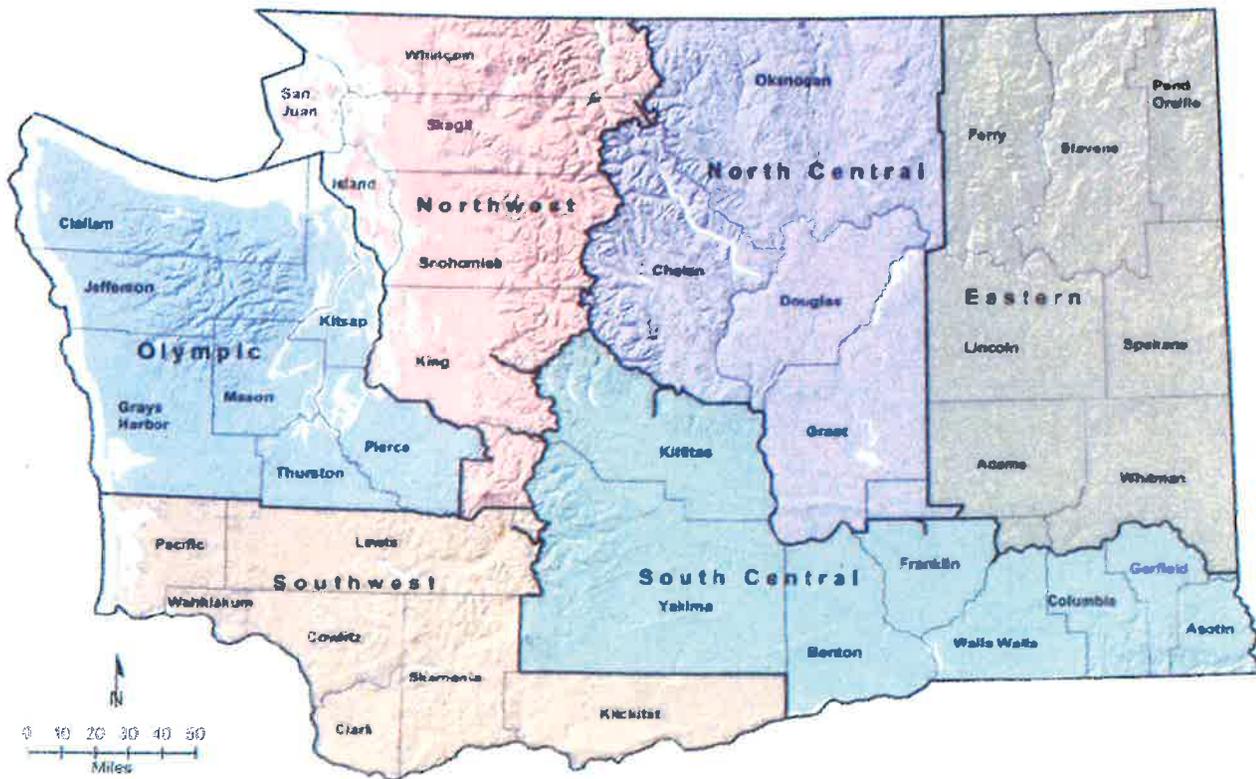


Table 5. Fish Passage Barrier Assessment Summarized Across Six WSDOT Regions

WSDOT Region	Fish-bearing Water Crossings	Fish Passage Barriers	Barriers with Significant Habitat Gain	Barriers with Limited Habitat Gain ¹	Barriers with Habitat Threshold Gain Not Determined	Barriers Fixed ²
Northwest	1025	584	435	142	7	144
North Central	231	135	99	34	2	15
Olympic	1034	643	497	143	3	82
Southwest	723	359	270	76	13	37
South Central	266	91	72	14	5	8
Eastern	406	177	157	19	1	15
Totals	3685	1989	1530	428	31	301

Based on WSDOT Fish Passage Inventory as of June 1, 2016.

¹ Barriers with less than 200 m potential habitat gain.

² Three hundred and one WSDOT fish passage barriers have been reported as replaced or retrofitted for fish passage; however, some of these require additional work to meet current fish passage criteria.

U.S. v. WA List of WSDOT Case Area Barrier Culverts

A list of culverts blocking salmon or steelhead passage within the case area was filed on September 27, 2013, containing 1,014 barriers, including 847 with a significant habitat gain and 167 with a limited habitat gain.

As of June 1, 2016, WSDOT has 996 culvert barriers relevant to the U.S. v. WA case - 825 with significant habitat upstream (≥ 200 m) and 171 with a limited habitat gain (< 200 m).

The List of WSDOT Case Area Barrier Culverts (Case 2:01-sp-00001-RSM Document 779-1) is updated as WSDOT learns new information about culverts within the case area and the disposition of culverts may change. The injunction requires the state to re-evaluate non-barrier culverts once every ten years to determine whether they remain passable. Newly identified barriers are discovered as part of this re-inventory work, as the culvert conditions change over time and become barriers.

Updates to the September 2013 List of WSDOT Case Area Barrier Culverts:

- 23 barriers have been corrected and are no longer barriers,

- 25 culverts are on resident-fish streams, not containing steelhead or salmon,
- 3 barriers are on streams determined to be non-fish bearing,
- 4 barriers are equipped with tide gates,
- 1 barrier was a duplicate record in WDFW's database,
- 7 barriers were re-evaluated as fish passable,
- 12 barriers were incorrectly assigned to WSDOT ownership, and
- 57 new barrier culverts were identified.

Appendix II lists the barrier culverts relevant to the injunction as of June 1, 2016. Appendix III lists the updates to the September 2013 List of WSDOT Case Area Barrier Culverts.

Appendix IA. WSDOT Northwest Region Fish Passage Barriers. Sorted by road and milepost. (as of June 1, 2016)

Site Id	Road	Mile-post	Feature Type ¹	Stream Name	WRIA	% Fish Pass-able	P	Culvert Shape ¹	Culvert Material ¹	Span (ft)	Rise (ft)	Length (m)	WS Drop (m)	% Slope	Lineal Gain (m)	Spawn Area (m ²)	Rear Area (m ²)
990102	SR 410	36.49	C	Cyclone Cr	10.0105	0	4.38	1.1 BOX	PCC	2.44	2.44	28.6	0.8	9	385	432	2205
991219	SR 410	39.18	C	White R trib	10	0		1.1 RND	PCC	0.76	0.76	16.4	0.36	4	36		
996661	SR 410	40.31	C	White R trib	10	0		1.1 RND	PCC	0.61	0.61	15.3	0.21	8.9	102		
996662	SR 410	40.51	C	White R trib	10	0		1.1 RND	PCC	0.76	0.76	21.3	0.67	1.2	48		
105 R022221a	SR 410	41.42	C	White R trib	10	0	5.46	1.1 RND	PCC	0.91	0.91	15.4	0	4.95	524	275	665
105 R071916a	SR 410	48.29	C, FI	Boundary Cr	10.0250	33	7.55	1.1 RND	PCC	1.22	1.22	29.6		2.4	596	453	647
996664	SR 410	48.94	C	unnamed trib	10	0		1.1 RND	PCC	0.61	0.61	22	0.7	7.8			
991012	SR 410	49.93	C	White R trib	10	33		1.1 SQSH	CST	1.4	1.01	24.5	0.24	1.7	0		
996671	SR 410	53.01	C	White R trib	10	67		1.1 SQSH	CST	1.05	0.83	28.2	0	3.9			
105 R072016a	SR 410	55.29	C	Dry Cr	10.0310	0	3.42	1.1 BOX	CPC	1.52	1.52	25.9	3.04	5.6	431	215	812
991016	SR 410	55.51	C	Deep Cr	10	0	7.82	1.1 BOX	CPC	1.83	1.83	36.2	2.86	5.74	548	1391	2060
105 R072018a	SR 410	59.57	C	White R trib	10	0	17.52	1.2 RND	PCC	0.76	0.76	13.4	0	7.16	37		
105 R072018a	SR 410	59.57	C	White R trib	10	0	17.52	2.2 RND	PCC	0.76	0.76	13.4	0	7.16	37		
996266	SR 509	9.18	C	Puget Sound trib	10	0		1.1 RND	CST	0.76	0.76	40.1	0.64	2.9			
991651	SR 509	9.60	C	Puget Sound trib	10	33		1.2 RND	PCC	0.76	0.76	75.1	0	4.3	166		
991651	SR 509	9.60	C	Puget Sound trib	10	33		2.2 RND	PCC	0.76	0.76	75	0	4.4	166		
996270	SR 509	10.96	C	Lakota Cr	10.0386	0	17.96	1.1 RND	PCC	1.07	1.07	41.5	0	4.91	836	578	6687
996272	SR 509	11.43	C	Lakota Cr trib	10.0387	0	14.80	1.1 RND	OTH	0.46	0.46	285.1	0.3	0.16	595	1510	9428
991192	SR 509	13.49	C	Puget Sound trib	09.0385	0		1.1 RND	CST	1.07	1.07	36.6	1.22	6.4			
997675	SR 509	14.23	C	Redondo Cr	09.0384	0	20.34	1.1 RND	PCC	0.61	0.61	440	0.1	25	1436	89	25784
997679	SR 509	24.42	C, FI	Miller Cr	09.0371	33	23.33	1.2 RND	SPS	1.83	1.83	135	0		5783	4124	10201
997679	SR 509	24.42	C, FI	Miller Cr	09.0371	33	23.33	2.2 RND	SPS	1.83	1.83	135	0		5783	4124	10201
997678	SR 509	28.90	D	NF Hamm Cr	09	0									70		
997681	SR 509	29.06	C	Lost Fork Hamm Cr	09	0		1.1 RND	CST	0.91	0.91	227	3.7				
997682	SR 509	29.20	C	Lost Fork Hamm Cr	09	0		1.1 RND	PCC	0.46	0.46	-999.9					
997645	SR 515	3.97	C	Panther Cr	09.0006	33	19.91	1.1 RND	PCC	0.91	0.91	65.4	0	1.3	1725	772	22742
994409	SR 515	7.08	C	Springbrook Cr trib	09	33	7.23	1.1 OTH	OTH	1.75	1.1	430	0	1.07	1231	65	475
991191	SR 516	0.41	C	Barnes Cr	08.0380	87	8.80	1.1 RND	OTH	0.61	0.61	29.5	0	2.3	1789	1066	2055
997674	SR 516	1.28	C	Massey Cr trib	09	0		1.1 RND	OTH	0.5	0.5	47.8	0	3.5	164		
997649	SR 516	2.98	C	Green R trib	09.0043	0	8.77	1.1 RND	CST	0.91	0.91	111.6	0	7.51	409	196	573
997651	SR 516	5.80	C	Mill Cr	09.0015	67	11.74	1.1 RND	CST	1.22	1.22	185	0		4561	4871	6196
997670	SR 516	10.58	C	Big Soos Cr trib	09	67	13.68	1.1 RND	PCC	0.91	0.91	55.5	0	0.88	3514	368	11368
998886	SR 518	2.27	C	Gilliam Cr	09.0032	0	5.64	1.1 RND	CST	0.91	0.91	270.8	0		236	13	104
992651	SR 518	2.59	C	Gilliam Cr trib	09	0	4.97	1.1 RND	CST	0.61	0.61	57.3	1.53		140	37	97
997697	SR 518	3.57	C	unnamed trib	09	0		1.1 RND	CST	0.46	0.46	60.8	0		171		
994117	SR 520	5.42	C	Lk Washington trib	08	0		1.1 RND	CST	0.91	0.91	98.7	4.42	8.07	33		
990167	SR 520	7.90	C	Goff Cr	08	0	18.61	1.2 RND	CST	0.91	0.91	77.4	1.26	4.9	710	704	897
990167	SR 520	7.90	C	Goff Cr	08	0	18.61	2.2 RND	CST	0.91	0.91	77.4	1.45	4.8	710	704	897
990430	SR 522	2.86	C, FI	Thornton Cr	08.0030	67	19.16	1.1 BOX	CPC	1.51	1.85	84.3	0	1.26	7076	2966	29560
990655	SR 522	6.63	C	Cat Whisker Cr	08.0056	0	18.94	1.1 OTH	OTH	1.46	1.46	200.6	0.77	6	5185	1758	14607
996928	SR 522	9.60	C	Horse Cr	08	33	17.46	1.1 RND	OTH	0.91	0.91	630	0		2642	485	4637

Draft Scope of Work
City of Des Moines
Municipal Storage Yard Stormwater BMP Improvement Plan

Work contemplated to be performed under this contract is as follows:

- Draft a Stormwater Best Management Practice (BMP) Improvement Plan for two municipally-owned storage yards in the City of Des Moines. This includes both the Public Works Service Center Yard at 2255 South 223rd Street and the City Maintenance shop at 21650 11th Avenue South. The intent of BMP Improvement Plan is to address the structural BMP deficiencies at each site and how those will be remedied in the future. The plan will be incorporated into the SWPPP document for each of these facilities. The plan shall include the following work items:
 - The Stormwater BMP Improvement Plan shall address the following structural BMPs and their most cost effective solutions, provide any alternatives, applicable cost estimates, and designs.
 - Secondary Containment for Existing Stationary De-Icer Tank (A-2)
 - Containment and Cover for Existing Material Storage Bays (A-4)
 - Cover and Containment for Scrap Vehicles Stored on Site (A-9)
 - Covered and Contained Vehicle Washing Area that is Connected to Sewer (A-13)
 - Cover and Containment for Existing Fuel Station (A-47)
 - Provide a strategic layout for each site that will create the most cost effective solution in providing BMPs for pollution-generating activities.
 - Provide a recommended timeline for implementation of each improvement weighted on cost and water quality impact.
 - Follow the requirements set forth by the 2016 King County Stormwater Pollution Prevention Manual for commercial sites. This document gives the specific instruction on each BMP requirement. This plan shall specifically refer to BMPs A-2, A-4, A-9, A-13, and A-47.

This is a Public Works Project which is subject to Prevailing Wages. A current City of Des Moines Business License is required for all contractors and subcontractors that perform work under this contract. These licenses shall be in place prior to the issuance of any Notice to Proceed.

PROJECT LOCATIONS

This scope of services includes two sites owned by the City of Des Moines.

Site 1: Public Works Service Center Yard at 2255 South 223rd Street which includes the Public Works Maintenance Building and parking; storage areas for a variety of maintenance materials (some covered, others not); a de-icer tank and salt storage; and a fuel station.

Site 2: City Maintenance shop at 21650 11th Avenue South which includes the Public Works Engineering Building and a storage building, dumpsters, a gas remediation area, parking areas for employees, and impounded vehicles.

PROJECT CONTACT

Please contact Tyler Beekley, Project Manager, at (206) 870-6869 or tbeekley@desmoineswa.gov for any project related questions.

PROJECT PHASING

The contract will be phased as follows and as detailed below in the Scope of Work:

- **Initial Phase:** Conceptual design of site to optimize operational performance, planning-level estimates, permitting identification, and prioritization.
- **Future Phase (not included in this scope):** PS&E design services including permitting, and geotechnical engineering, and survey.

SCOPE OF WORK

TASK 100 – PROJECT MANAGEMENT AND MEETINGS

Task 100 includes all work related to the management, administration, and coordination of Consultant activities for the initial phase. The Consultant will provide project management services including:

100.01 Project Team Management and Coordination (Assume six-month design duration).

The Consultant will attend up to four (4) meetings with City staff. The following meetings are anticipated:

1. Kickoff Meeting – including the appropriate individuals from operations and other City staff as needed to answer specific questions on operational needs of the two sites.
2. Design Development Meeting – review of preliminary alternatives for the two sites and development of the criteria for evaluating the options.
3. Selection of Preferred Alternatives – KPFF to provide evaluation matrix in advance of meeting. Team to review data and make selections based on the costs and assign value of the various BMPs.
4. Prioritization and Implementation Meeting – the purpose of this meeting will be to review the draft implementation plan and schedule.

100.02 Internal Project Team Meeting Organization, Facilitation, and Documentation

Prepare team meeting agendas and notes. Internal coordination amongst team. See LOE for hours per month. Assume six-month duration.

100.03 Project Schedule

Submit for approval a detailed project schedule for the scope of services identifying meetings, key milestones, and project deliverables. Submit one draft for City review and a revised final.

100.04 Monthly Progress Reports (Assume 6 reports)

The Consultant will submit a monthly progress report to the Project Manager by a mutually agreed upon date. Monthly progress reports will include:

- A brief narrative of work completed for the prior month for each Consultant task/subtask
- A brief narrative of work expected to be completed during the next month for each Consultant task/subtasks
- Decisions/Issues/Changes Log, updated monthly, tracking project decisions
- Action Items Log, updated monthly, tracking actions, results, and impacts to scope, schedule, and budget
- ~~Spreadsheet including progress estimation and earned value calculations~~

Deliverables

- Project Schedule, draft and final
- Project Coordination and Team Meeting Agendas and Notes
- Monthly Progress Reports (submitted with each invoice)

Assumptions

- Prepare the agendas, facilitate meetings, and prepare and distribute meeting notes for all meetings unless otherwise noted.

TASK 200 – SCHEMATIC DESIGN

The objective of this task is to provide analysis and preliminary design to assist the City in evaluation and selection of a preferred site layout to optimize facility operations. A Stormwater BMP Improvement Plan will be developed to address the structural BMPs identified in the SWPPP. The level of design shall be sufficient to create a preliminary cost estimate and to prioritize improvements with each site.

200.01 Base Mapping and Document Review

The Consultant will be provided with a surveyed-scanned survey of the sites (no CAD) and an aerial image to serve as the basemap of the schematic design project area. Using these resources the Consultant will: perform a site review and verification of the City-provided base mapping. This work shall include:

1. One field verification of City-provided base mapping. Two engineers will attend this field meeting, which is anticipated to last 4 hours including travel time to and from the site.
2. Coordinate with applicable utility districts and/or companies to obtain utility location drawings and to determine all service connections.

200.02 Alternatives Analysis and Concept Design

Complete an alternatives analysis for two site layout options for each site. To accomplish this, KPFF shall develop concept design drawings for each site to support the basic program requirements. The site alternatives shall be designed for maximum operational efficiency. City staff including Engineering and O&M staff will partake in the Design Development meeting of Task 100 to provide insight on the operation needs and equipment used at each site.

Concept design drawings for the two alternatives will include a site plan identifying the key site functions and the required structural BMPs to address each.

200.03 Structural Design Support

Provide Type Size and Location conceptual options, and cost estimating for the following elements:

1. Up to three open canopy structures, including description of materials
2. Up to three concrete secondary containment facilities

200.04 Alternative Matrix

Develop an alternative matrix to summarize the benefits and drawbacks of the alternatives. KPFF will work with the City to define the evaluation criteria to be considered in the matrix. The Consultant will provide a matrix summarizing for the two alternatives at each site various conditions/impacts to aid in selection of the preferred alternative including, but not limited to:

- The impacts to trees and sensitive areas
- Costs and constructability challenges
- Structure (cover and containment) alternatives and range of cost
- Risks and benefits

A draft matrix will be submitted to the City for review and comment.

200.05 Schematic Design

Upon selection of preferred site layout and Structural BMPs, develop Schematic Design documents to include:

1. Plans: Drawings of site plan, sections, and details sufficient to indicate site conditions, general scope and character of the site, including size, location, and relationship of the Project components, including diagrammatic or schematic drawings of proposed civil and structural building elements.

Plans will include basic dimensions and features;. Anticipated drawing include: Cover Sheet, Site Layout, Site Preparation (Demo) and Tree Retention Plan, Grading and

Drainage Plan, and Type Size and Location Plan for canopies and containment structures (no member sizes, slab or wall thicknesses, or details for structural elements).

2. Preliminary construction cost estimate to be used by the City and KPFF to develop an implementation plan based on available funds and cost/benefit analysis.
3. Update the project implementation schedule showing all of the related activities of the Project.
4. Utility Design Coordination: Identify and prepare a list of utilities that may conflict with proposed improvements.
- 4.5. Update existing Draft Stormwater Pollution Prevention Plans (SWPPP) prepared by the City for each site.

Deliverables

- ~~Two (2) Alternative Concept Schematic Design~~ Plans for each site
- Alternatives Matrix – draft and final
- Schematic Design:
 - Plans: Two (2) full-size hard copies (22"x 34"; 1" = 20' scale), one (1) half size hard copy and submit electronically the 30% schematic design package (.pdf and native files) to the City.
- Project implementation plan schedule
- Preliminary cost estimates for each site for the selected alternatives
- SWPPP for each of the two sites
- Meeting agendas, presentation materials, and notes

Assumptions

- ~~CAD basemap to be provided by the City including topographic information, boundary survey, and critical areas that may be present.~~
- The Consultant will submit a draft of the Schematic Design Package for City review. The City will review and provide comments, which will be incorporated in a final submission.
- Geotechnical services are not included at this time.
- Specifications are not included as part of this scope of services.

		Category and Hours						1.38
		Principal	Project Manager	Structural Design Engineer	Civil Design Engineer	Civil CADD	Admin	
Item	SCOPE OF WORK	\$ 64.43	\$ 58.93	\$ 55.29	\$ 43.16	\$ 30.14	\$ 19.26	30%
100 Project Management and Meetings								
100.01	Project Team Management and Coordination		12		12			\$ 3,277
100.02	Internal Project Team Meeting		12	8	32			\$ 6,770
100.03	Project Schedule		4					\$ 631
100.04	Monthly Progress Report		6				3	\$ 1,100
Subtotals:		0	34	8	44	0	3	\$ 11,778
200 Schematic Design								
200.01	Base Mapping/Document Review		4		4			\$ 1,092
200.02	Alternatives Analysis and Concept Design		16	2	28	20		\$ 7,664
200.03	Structural Design Support			10				\$ 1,479
200.04	Alternative Matrix		4	2	6			\$ 1,619
200.05	Schematic Design		24	4	58	30	4	\$ 13,697
Subtotals:		0	48	18	96	50	4	\$ 25,552

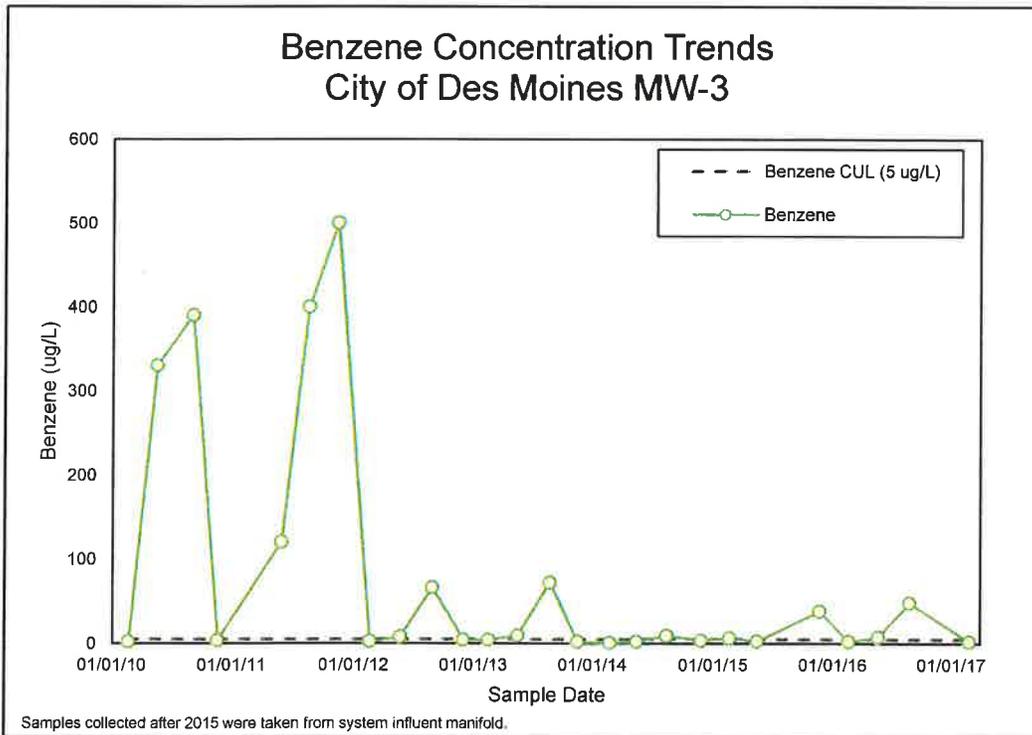
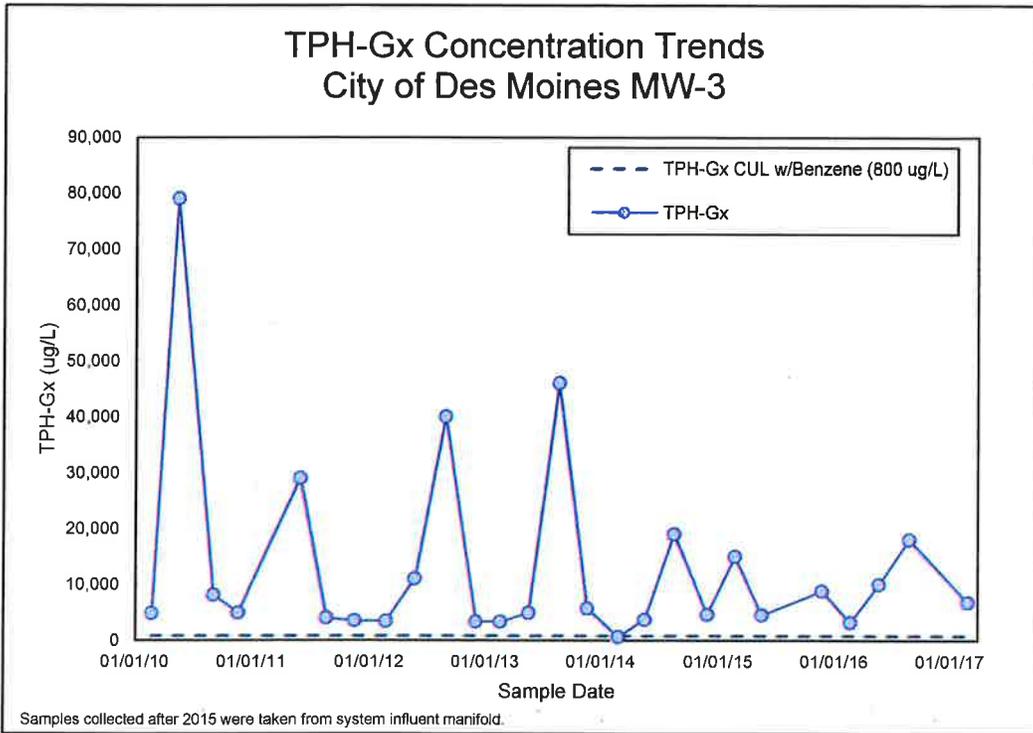
LABOR TOTALS:	0	82	26	140	50	7	\$ 37,330
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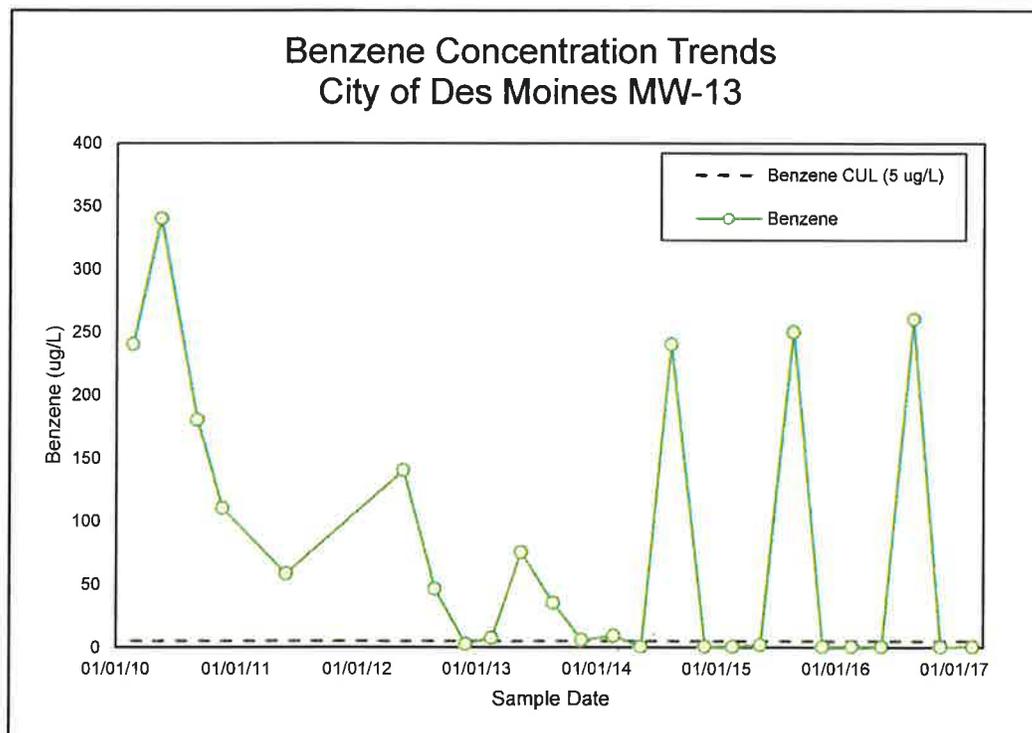
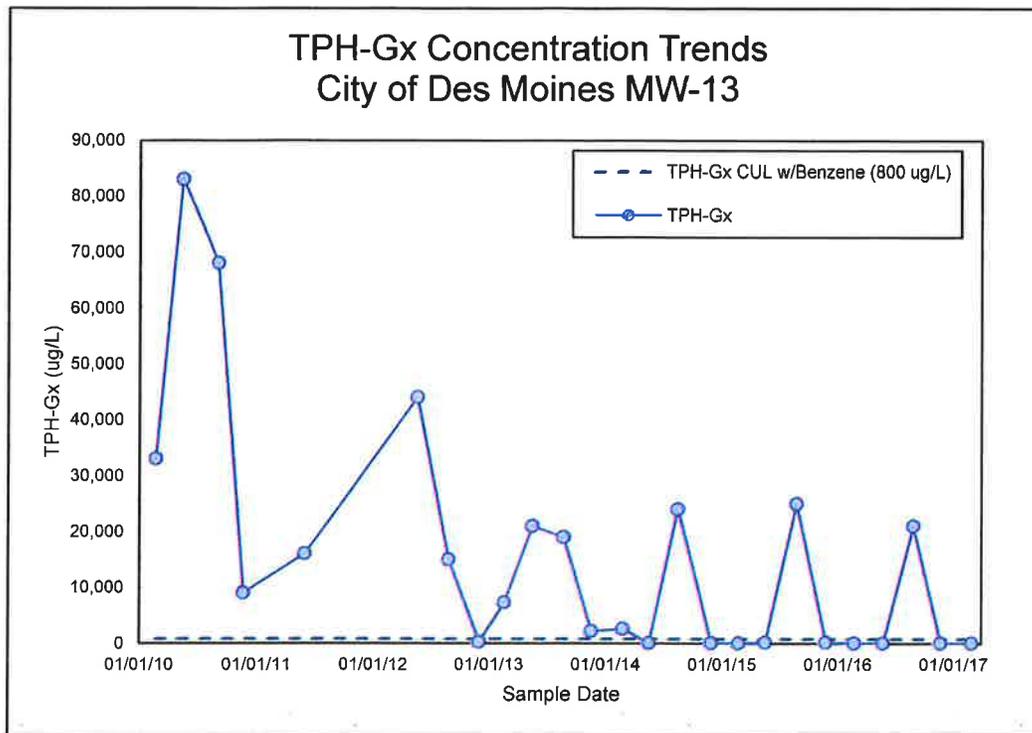
Other Direct Costs		
Description	Qty	
Item		\$ -
		\$0

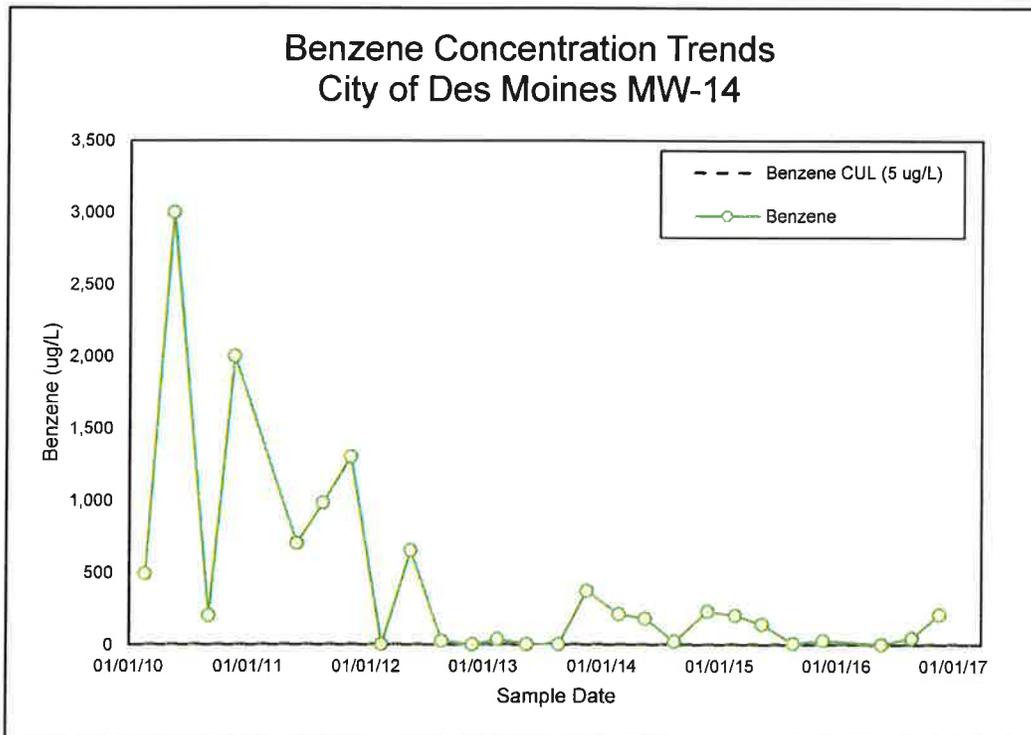
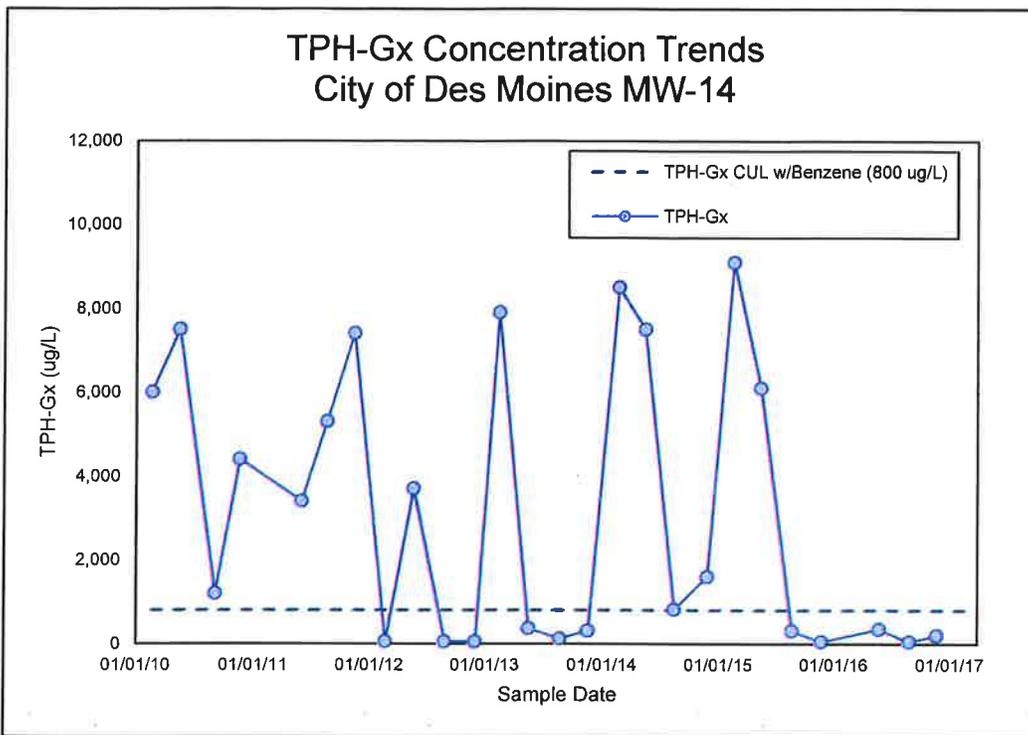
\$ 37,330



amec
foster
wheeler







Client Draft

TABLE 3

GROUNDWATER ANALYTICAL RESULTS ^{1,2} City of Des Moines Des Moines, Washington



all concentrations in micrograms per liter (µg/L)

Monitoring Well ID	Sampling Date	Sample ID	Gasoline Range Hydrocarbons	Benzene	Toluene	Ethylbenzene	m,p-Xylene	o-Xylene	Total Xylenes
MTCA Method A Cleanup Levels			1000/800³	5	1000	700	NA	NA	1000
MW-3 ⁴	2/17/2010	MW3-021710	4,800	1.7	32	140	560	240	800
	2/17/2010	DUP-021710	4,700	1.6	31	120	460	210	670
	5/13/2010	MW3-051310	79,000	330	12,000	2,100	7,600	2,600	10,200
	8/31/2010	MW3-83110	8,100	390	640	220	750	210	960
	11/16/2010	MW3-111610	4,900	3.0	14	140	490	230	720
	11/16/2010	DUP-111610	4,800	3.3	13	140	510	240	750
	5/27/2011	MW3-52711	29,000	120	5,200	1,100	4,000	1,400	5,400
	8/16/2011	MW3-081611	3,300	370	19	87	410	13	423
	8/16/2011	DUP-081611	4,000	400	20	99	490	13	503
	11/11/2011	MW03-111111	3,500	500	13	50	350	9.7	360
	11/11/2011	DUP-111111	3,500	500	10	51	410	8.6	419
	2/16/2012	MW3-021612	3,400	<4.0	7.4	140	390	170	560
	5/17/2012	MW03-051712	11,000	7.5	14	300	870	390	1,260
	5/17/2012	DUP-051712	11,000	6.0	13	290	1,100	280	1,380
	8/23/2012	MW3-082312	40,000	66	3,000	830	2,900	1,000	3,900
	11/27/2012	MW3-11272012	3,300	4.0	13	150	390	230	620
	2/13/2013	MW3-021313	3,300	4.1	7.9	180	270	65	335
	2/13/2013	DUP-01	3,400	4.1	12	170	250	74	324
	5/14/2013	MW3-51413	4,900	9.1	620	140	540	310	850
	8/20/2013	MW3-082013	37,000	54	6,800	1,800	5,600	2,000	7,600
	8/20/2013	DUP-1-082013	46,000	72	7,800	2,000	6,400	2,300	8,700
	11/14/2013	MW3-111413	5,700	<4.0	6.5	160	580	240	820
	2/20/2014	MW3-022014	590	<1.0	17	7.3	66	39	105
5/13/2014	MW3-051314	3,700	<4.0	<4.0	150	290	150	440	
8/12/2014	MW3-081214	19,000	9.0	280	810	2,700	570	3,270	
8/12/2014	DUP-081214	19,000	8.9	280	890	2,900	620	3,520	
11/24/2014	MW3-112414	4,600	3.3	22	180	650	310	960	
11/24/2014	DUP-112414	4,600	3.2	22	150	550	260	810	
2/18/2015	MW3-021815	15,000	6.1	8.1	550	2,000	350	2,350	

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TABLE 3

GROUNDWATER ANALYTICAL RESULTS ^{1,2}

City of Des Moines
Des Moines, Washington



all concentrations in micrograms per liter (µg/L)

Monitoring Well ID	Sampling Date	Sample ID	Gasoline Range Hydrocarbons	Benzene	Toluene	Ethylbenzene	m,p-Xylene	o-Xylene	Total Xylenes
MTCA Method A Cleanup Levels			1000/800³	5	1000	700	NA	NA	1000
MW-3 ⁴ (Continued)	5/13/2015	MW3-051315	4,500	2.4	4.3	300	1,000	330	1,330
	11/19/2015	MW3-111915	8,800	38	16	350	1,100	190	1,290
	2/18/2016	MW3-021816	3,200	<4.0	<4.0	84	240	87	327
	5/19/2016	MW-3-051916	10,000	7.4	9.4	380	1,100	340	1,440
INF	11/24/2014	INF-H2O-112414	20,000	7.4	13	580	2,500	820	3,320
	8/24/2016	INF-082416	18,000	48	77	1,500	1,900	240	2,140
	2/23/2017	INF-022317	6,800	<4.0	14	200	620	250	870
MW-4	3/7/2012	MW4-030712	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/17/2012	MW4-051712	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	8/23/2012	MW4-082312	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	11/27/2012	MW4-11272012	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/13/2013	MW4-021313	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/14/2013	MW4-51413	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	8/20/2013	MW4-082013	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	11/14/2013	MW4-111413	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/20/2014	MW4-022014	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/13/2014	MW4-051314	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	8/12/2014	MW4-081214	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	11/24/2014	MW4-112414	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/18/2015	MW4-021815	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/13/2015	MW4-051315	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	8/19/2015	MW4-081915	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	11/19/2015	MW4-111915	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/18/2016	MW4-021816	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/19/2016	MW-4-051916	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	8/24/2016	MW-4-082416	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	11/17/2016	MW-4-111716	<100	<0.20	<1.0	<0.20	<0.40	<0.20	<0.60
2/23/2017	MW-4-022317	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	

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TABLE 3

GROUNDWATER ANALYTICAL RESULTS ^{1,2}

City of Des Moines
Des Moines, Washington



all concentrations in micrograms per liter (µg/L)

Monitoring Well ID	Sampling Date	Sample ID	Gasoline Range Hydrocarbons	Benzene	Toluene	Ethylbenzene	m,p-Xylene	o-Xylene	Total Xylenes
MTCA Method A Cleanup Levels			1000/800³	5	1000	700	NA	NA	1000
MW-5	3/7/2012	MW5-030712	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/17/2012	MW5-051712	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	8/23/2012	MW5-082312	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	11/27/2012	MW5-11272012	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/13/2013	MW5-021313	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/14/2013	MW5-51413	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	8/20/2013	MW5-082013	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	11/14/2013	MW5-111413	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/20/2014	MW5-022014	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/13/2014	MW5-051314	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	8/12/2014	MW5-081214	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	11/24/2014	MW5-112414	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/18/2015	MW5-021815	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/13/2015	MW5-051315	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	8/19/2015	MW5-081915	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	11/19/2015	MW5-111915	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/18/2016	MW5-021816	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
5/19/2016	MW-5-051916	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
8/24/2016	MW-5-082416	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
11/17/2016	MW-5-111716	<100	<0.20	<1.0	<0.20	<0.40	<0.20	<0.60	
2/23/2017	MW-5-022317	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
MW-6	2/17/2010	MW6-021710	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/13/2010	MW6-051310	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	8/31/2010	MW6-83110	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	11/16/2010	MW6-111510	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/27/2011	MW6-52711	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	8/16/2011	MW6-081611	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	11/11/2011	MW6-111111	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2/16/2012	MW6-021612	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	

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TABLE 3

GROUNDWATER ANALYTICAL RESULTS ^{1,2}
 City of Des Moines
 Des Moines, Washington



all concentrations in micrograms per liter (µg/L)

Monitoring Well ID	Sampling Date	Sample ID	Gasoline Range Hydrocarbons	Benzene	Toluene	Ethylbenzene	m,p-Xylene	o-Xylene	Total Xylenes
MTCA Method A Cleanup Levels			1000/800³	5	1000	700	NA	NA	1000
MW-6 (Continued)	5/17/2012	MW6-051712	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	8/23/2012	MW6-082312	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	11/27/2012	MW6-11272012	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/13/2013	MW6-021313	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/14/2013	MW6-51413	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	8/20/2013	MW6-082013	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	11/14/2013	MW6-111413	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/20/2014	MW6-022014	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/13/2014	MW6-051314	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	8/12/2014	MW6-081214	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	11/24/2014	MW6-112414	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/18/2015	MW6-021815	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/13/2015	MW6-051315	<400	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
	8/19/2015	MW6-081915	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	11/19/2015	MW6-111915	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/18/2016	MW6-021816	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/19/2016	MW-6-051916	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
8/24/2016	MW-6-082416	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
2/23/2017	MW-6-022317	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
MW-7	2/17/2010	MW7-021710	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/13/2010	MW7-051310	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	8/31/2010	MW7-83110	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	11/15/2010	MW7-111510	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/23/2017	MW-7-022317	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-8	2/17/2010	MW8-021710	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/13/2010	MW8-051310	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	8/31/2010	MW8-83110	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	11/15/2010	MW8-111510	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

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TABLE 3

GROUNDWATER ANALYTICAL RESULTS ^{1,2} City of Des Moines Des Moines, Washington



all concentrations in micrograms per liter (µg/L)

Monitoring Well ID	Sampling Date	Sample ID	Gasoline Range Hydrocarbons	Benzene	Toluene	Ethylbenzene	m,p-Xylene	o-Xylene	Total Xylenes
MTCA Method A Cleanup Levels			1000/800³	5	1000	700	NA	NA	1000
MW-9	2/17/2010	MW9-021710	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/13/2010	MW9-051310	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	8/31/2010	MW9-83110	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	11/16/2010	MW9-111610	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/18/2015	MW9-021815	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/23/2017	MW-9-022317	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-10	2/17/2010	MW10-021710	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/13/2010	MW10-051310	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	8/31/2010	MW10-83110	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	11/16/2010	MW10-111610	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-12	2/17/2010	MW12-021710	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/13/2010	MW12-051310	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	8/31/2010	MW12-83110	1,000	<4.0	6.1	18	44	22	66
	11/16/2010	MW12-111610	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/27/2011	MW12-52711	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	8/16/2011	MW12-081611	<100	<1.0	<1.0	<1.0	1.7	2.6	4.3
	11/11/2011	MW12-111111	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/16/2012	MW12-021612	<100	<1.0	8.4	1.5	5.3	3.2	8.5
	5/17/2012	MW12-051712	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	8/23/2012	MW12-082312	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	11/27/2012	MW12-11272012	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/13/2013	MW12-021313	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/14/2013	MW12-51413	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	8/20/2013	MW12-082013	340	2.3	5.9	5.4	11	10	21
	11/14/2013	MW12-111413	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/20/2014	MW12-022014	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
5/13/2014	MW12-051314	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
	2/23/2017	MW-12-022317	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

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GROUNDWATER ANALYTICAL RESULTS ^{1,2} City of Des Moines Des Moines, Washington



all concentrations in micrograms per liter (µg/L)

Monitoring Well ID	Sampling Date	Sample ID	Gasoline Range Hydrocarbons	Benzene	Toluene	Ethylbenzene	m,p-Xylene	o-Xylene	Total Xylenes
MTCA Method A Cleanup Levels			1000/800³	5	1000	700	NA	NA	1000
MW-13 ⁵	2/17/2010	MW13-021710	33,000	240	8,000	1,400	5,000	1,800	6,800
	5/13/2010	MW13-051310	83,000	340	11,000	2,300	7,900	2,800	10,700
	5/13/2010	DUP-051310	83,000	340	12,000	2,300	8,000	2,800	10,800
	8/31/2010	MW13-83110	68,000	180	7,600	1,900	6,000	2,100	8,100
	11/16/2010	MW13-111610	9,000	110	1000	270	900	320	1,220
	5/27/2011	MW13-52711	16,000	58	2,200	490	1,900	650	2,550
	5/17/2012	MW13-051712	44,000	140	8,000	1,900	5,800	2,300	8,100
	8/23/2012	MW13-082312	15,000	46	600	430	1,200	560	1,760
	8/23/2012	DUP-082312	11,000	53	720	310	1,100	420	1,520
	11/27/2012	MW13-112712	260	2.5	6.7	8.8	29	7.3	36
	11/27/2012	DUP-112712	290	2.7	7.2	9.4	31	7.6	39
	2/13/2013	MW13-021313	7,300	7.2	53	210	770	160	930
	5/14/2013	MW13-51413	20,000	75	4,700	460	1,600	700	2,300
	5/14/2013	Dup-51413	21,000	61	4,100	540	2,000	2,000	4,000
	8/20/2013	MW13-082013	19,000	35	2,000	770	2,500	770	3,270
	11/14/2013	MW13-111413	2,200	5.6	120	66	250	110	360
	2/20/2014	MW13-022014	2,600	9.0	66	90	110	140	250
	5/13/2014	MW13-051314	<100	<1.0	<1.0	<1.0	1.4	<1.0	1.4
	8/12/2014	MW13-081214	24,000	240	5,300	1,100	3,100	1,300	4,400
	11/24/2014	MW13-112414	<100	<1.0	<1.0	1.7	3.7	1.8	5.5
2/18/2015	MW13-021815	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
5/13/2015	MW13-051315	<400	<4.0	36	15	45	17	62	
8/19/2015	MW13-081915	25,000	250	4,600	1,300	4,200	1,900	6,100	
11/19/2015	MW13-111915	200	<1.0	<1.0	9.9	31	14	45	
2/18/2016	MW13-021816	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
2/18/2016	DUP-021816	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
5/19/2016	MW-13-051916	<100	<1.0	<1.0	1	1.3	<1.0	1.3	
8/24/2016	MW-13-082416	21,000	260	2,400	880	2,600	1,200	3,800	

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GROUNDWATER ANALYTICAL RESULTS ^{1,2} City of Des Moines Des Moines, Washington



all concentrations in micrograms per liter (µg/L)

Monitoring Well ID	Sampling Date	Sample ID	Gasoline Range Hydrocarbons	Benzene	Toluene	Ethylbenzene	m,p-Xylene	o-Xylene	Total Xylenes
MTCA Method A Cleanup Levels			1000/800³	5	1000	700	NA	NA	1000
MW-13 ⁵ (Continued)	8/24/2016	MW-16-082416	23,000	270	2,600	970	2,800	1,300	4,100
	11/17/2016	MW-13-111716	<100	<0.20	<1.0	1.6	14	9.2	23.2
	2/23/2017	MW-13-022317	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/23/2017	MW-131-022317	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-14 ⁵	2/16/2010	MW14-021609	6,000	490	480	150	650	200	850
	5/13/2010	MW14-051310	7,500	3,000	90	490	700	140	840
	8/31/2010	MW14-83110	1,200	200	18	94	78	25	103
	11/16/2010	MW14-111610	4,400	2,000	45	340	300	25	325
	5/27/2011	MW14-52711	3,400	700	82	250	460	90	550
	8/16/2011	MW14-081611	5,300	980	31	320	540	73	613
	11/11/2011	MW14-111111	7,400	1,300	39	470	1,100	80	1,180
	2/16/2012	MW14-021612	<100	1.6	<1.0	2.1	4.7	2.0	6.7
	5/17/2012	MW14-051712	3700	650	39	370	300	43	343
	8/23/2012	MW14-082312	<100	26	<1.0	<1.0	<1.0	2.6	2.6
	11/27/2012	MW14-11272012	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/13/2013	MW14-021313	7,900	38	80	210	1,800	520	2,320
	5/14/2013	MW14-51413	370	2.0	1.9	15	45	11	56
	8/20/2013	MW14-082013	120	1.5	<1.0	1.9	<1.0	2.7	2.7
	11/14/2013	MW14-111413	310	370	3.8	7.4	4.4	<1.0	4.4
	2/20/2014	MW14-022014	8,500	210	85	640	1,700	190	1,890
	5/13/2014	MW14-051314	7,500	180	39	500	750	50	800
	8/12/2014	MW14-081214	820	23	<4.0	54	20	4.3	24
	11/24/2014	MW14-112414	1,600	230	21	120	99	9.8	109
	2/18/2015	MW14-021815	9,100	200	44	810	1,700	64	1,764
5/13/2015	MW14-051315	5,000	140	20	310	450	45	495	
5/13/2015	DUP-051315	6,100	140	21	310	430	46	476	
8/19/2015	MW14-081915	310	7.8	<1.0	9.2	12	6.4	18	
8/19/2015	DUP-081915	230	6.2	<1.0	7.0	8.4	4.9	13.3	

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GROUNDWATER ANALYTICAL RESULTS ^{1,2}

City of Des Moines
Des Moines, Washington



all concentrations in micrograms per liter (µg/L)

Monitoring Well ID	Sampling Date	Sample ID	Gasoline Range Hydrocarbons	Benzene	Toluene	Ethylbenzene	m,p-Xylene	o-Xylene	Total Xylenes
MTCA Method A Cleanup Levels			1000/800³	5	1000	700	NA	NA	1000
MW-14 ⁵ (Continued)	11/19/2015	MW14-111915	<100	28	<1.0	<1.0	<1.0	<1.0	<1.0
	5/19/2016	MW-14-051916	350	1.7	<1.0	14	36	2.6	38.6
	5/19/2016	DUP-051916	330	1.5	<1.0	13	33	2.5	35.5
	8/24/2016	MW-14-082416	<100	46	<1.0	1.7	2.3	1.7	4.0
	11/17/2016	MW-14-111716	<400	210	<5.0	9.0	7.0	<1.0	7.0
MW-15 ⁵	2/17/2010	MW15-021709	18,000	110	3,100	500	2,200	820	3,020
	5/13/2010	MW15-051310	3,900	80	23	310	280	73	353
	8/31/2010	MW15-83110	3,800	67	17	270	270	29	299
	8/31/2010	DUP-1-83110	3,600	440	160	98	380	69	449
	11/16/2010	MW15-111610	170	97	2.4	21	17	1.2	18
	5/27/2011	MW15-52711	3,900	580	150	120	540	210	750
	8/16/2011	MW-15-081611	8,200	1,200	93	290	780	140	920
	11/11/2011	MW-15-111111	4,400	240	24	140	230	120	350
	2/16/2012	MW-15-021612	4,400	410	1,400	810	2,500	820	3,320
	2/16/2012	DUP01-021612	4,100	420	1,300	770	2,400	780	3,160
	5/17/2012	MW15-051712	<100	22	<1.0	1.3	3.8	1.2	5.0
	8/23/2012	MW15-082312	1,200	1,500	12	52	42	8.0	50
11/27/2012	MW15-11272012	7,100	1,100	600	500	600	140	740	
MW-15 ⁵	2/13/2013	MW15-021313	14,000	87	330	320	1,700	440	2,140
	5/14/2013	MW15-51413	7,000	100	41	390	1400	140	1,540
	8/20/2013	MW15-082013	660	2.5	1.4	41	53	7.8	61
	11/14/2013	MW15-111413	<100	3.3	<1.0	<1.0	<1.0	<1.0	<1.0
	11/14/2013	Dup-1-111413	<100	3.2	<1.0	<1.0	<1.0	<1.0	<1.0
	2/20/2014	MW15-022014	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/20/2014	Dup-1-022014	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/13/2014	MW15-051314	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	8/12/2014	MW15-081214	910	4.5	10	61	84	<4.0	84
11/24/2014	MW15-112414	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	

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City of Des Moines
Des Moines, Washington



all concentrations in micrograms per liter (µg/L)

Monitoring Well ID	Sampling Date	Sample ID	Gasoline Range Hydrocarbons	Benzene	Toluene	Ethylbenzene	m,p-Xylene	o-Xylene	Total Xylenes
MTCA Method A Cleanup Levels			1000/800³	5	1000	700	NA	NA	1000
MW-15 ⁵ (Continued)	2/18/2015	MW15-021815	<100	<1.0	<1.0	<1.0	2.2	6.6	8.8
	2/18/2015	DUP-021815	<100	<1.0	<1.0	<1.0	2.5	7.9	10.4
	5/13/2015	MW15-051315	<400	<4.0	<4.0	<4.0	7.7	22	30
	8/19/2015	MW15-081915	1,300	<4.0	230	34	54	55	109
	11/19/2015	MW15-111915	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	11/19/2015	DUP-111915	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/19/2016	MW-15-051916	<100	<1.0	2.0	<1.0	2.9	8.9	11.8
	8/24/2016	MW-15-082416	330	1.8	45	5.4	8.5	8.8	17.3
	11/17/2016	MW-15-111716	<100	<0.20	<1.0	<0.20	<0.40	1.3	1.3
11/17/2016	MW-16-111716	<100	<0.20	<1.0	<0.20	<0.40	0.81	0.81	

Notes

- Gasoline Range Hydrocarbons analyzed by Ecology Method NWTPH-Gx; benzene, toluene, ethylbenzene, and xylenes analyzed by U.S. Environmental Protection Agency Method 8021.
- Bold** signifies detections exceeding the cleanup levels; "<" signifies analyte was not detected at or above the laboratory practical quantitation limit presented.
- Cleanup level dependent on presence of benzene. Lower value applies if detectable level of benzene was present in the sample.
- Recovery well.
- Diffuser wells. Diffuser system was operating immediately prior to 11/19/2015 sampling event. These wells were not sampled on 2/18/2016 due to in-well diffuser operations. No diffusion happened for at least one month prior to the 5/19/2016 sampling event.

Abbreviations

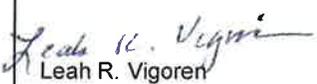
Dup = duplicate
MTCA = Model Toxics Control Act
NA = not applicable



ADDENDUM TO SERVICES

TO	City of Des Moines Department of Public Works 21650 11th Avenue South Des Moines, WA 98198 Attn: Loren Reinhold	DATE	PROPOSAL NO.	PAGE
		January 20, 2017	91P-23191	1 OF 1
		PROPOSAL NAME		
FROM	Amec Foster Wheeler Environment & Infrastructure, Inc. 600 University Street, Suite 600 Seattle, WA 98101 Attn: Leah R. Vigoren	Groundwater Remediation Action Plan		
		LOCATION		
		Des Moines, WA		
		SUBJECT		
		Supplement 7 (Change Order #7)		

ITEM	SCOPE OF WORK	ESTIMATED COST
0	This addendum to our Master Services Agreement is Change Order #7 to Contract 91P-19822. The CO #7 budget covers a two-year contract period from 2017 to 2018. See attached proposal dated January 20, 2017	
	CHANGE ORDER #7	\$102,504
Task 1	Routine O&M	\$37,124
Task 2	Quarterly sampling and reporting	\$65,380
	CHANGE ORDER #6 (approved on 5/27/2015)	\$111,016
Task 1	Routine O&M	\$49,941
Task 2	Quarterly sampling and reporting	\$61,075
	CHANGE ORDER #5 (approved on 10/27/2014)	\$24,931
	CHANGE ORDER #4 (12/19/2013)	\$0
	CHANGE ORDER #3 (approved on 12/13/2011 for two years 2012 to 2013)	\$129,730
	CHANGE ORDER #2	\$0
	CHANGE ORDER #1 (approved 2/19/2010)	\$79,035
	Carryover from original budget	\$63,885
	Change Order 1 additional budget	\$15,150
	Original proposal budget = \$151,559 (budget) – \$63,885 (unspent)	\$87,674
Original budget (\$151,559) approved on 9/11/2008 was under separate contract. Remaining budget was used under existing contract.		

SUBMITTED BY	AUTHORIZED BY
 Leah R. Vigoren Project Manager	ORGANIZATION
 John D. Long Senior Associate Hydrogeologist	SIGNATURE AND DATE
	NAME AND TITLE



January 20, 2017

Proposal No. 91P-23191

Mr. Loren Reinhold
City of Des Moines
Department of Public Works
21650 11th Avenue South
Des Moines, WA 98198

**Subject: Groundwater Remediation Action Plan
Change Order #7
Des Moines, WA**

Dear Mr. Reinhold:

This addendum to our Master Services Agreement constitutes Change Order (CO) #7 to Contract 91-19822. The CO #7 budget covers a two-year contract period, from 2017 to 2018.

The CO #7 scope of work covers ongoing operations and maintenance (O&M) (Task 1), as well as sampling and reporting (Task 2). Cost for each task is estimated, and it may be necessary to reallocate funds between the tasks; however, the overall budget for CO #7 will not be exceeded without authorization.

The following paragraphs outline the continuing scope of work for O&M and groundwater remediation services.

TASK 1: ROUTINE OPERATION AND MAINTENANCE

The scope of work for O&M includes inspections and quarterly O&M. Costs for inspections include travel time to the site, travel expenses, parking expenses, system inspections, routine maintenance, and project management. The quarterly O&M costs include travel time, travel expenses, routine maintenance, miscellaneous parts, and project management time.

In addition, the budget includes miscellaneous O&M contingency costs and the cost for planned sparge tank upgrades. The sparge tank upgrades include installation of a baffle in the tank to improve water treatment, which will make the process more efficient. We also included costs to replace the granular activated carbon units twice.

TASK 2: QUARTERLY SAMPLING AND REPORTING

The costs associated with quarterly sampling and reporting include travel expenses, travel time, sampling, sampling supplies, sample analysis per quarter, webDMR, data calculations, monitoring flow totals, data download, 2017 and 2018 Annual Reports, and project management. Samples will be collected from groundwater monitoring wells MW-3, MW-4, MW-5, MW-6, MW-13, MW-14, and



MW-15 (and potentially MW-12) as well as duplicates; influent and effluent water samples; and air system samples collected at discharge points. The groundwater samples will be analyzed for gasoline and for benzene, toluene, ethylbenzene, and xylene (BTEX); water system samples will be analyzed for gasoline, BTEX, pH, and lead; and air samples will be analyzed for gasoline and BTEX.

BUDGET SUMMARY

Change Order #7

Task 1. Routine O&M.....	\$37,124
Task 2. Quarterly sampling and reporting.....	\$65,380
Change Order #7 Budget.....	\$102,504

Change Order #6 (approved on 5/27/2015)

Task 1. Routine O&M.....	\$49,941
Task 2. Quarterly sampling and reporting.....	\$61,075
Change Order #6 Budget.....	\$111,016

Change Order #5 (approved on 10/27/2014)

Change Order #5 Budget.....	\$24,931
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Change Order #4 (12/19/2013)

Change Order #4 Budget.....	\$0
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Change Order #3 (approved on 12/13/2011 for two years 2012 to 2013)

Change Order #3 Budget.....	\$129,730
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Change Order #2

Change Order #2 Budget.....	\$0
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Change Order #1 (approved 2/19/2010)

Budget carryover from original.....	\$63,885
Change Order 1 additional budget.....	\$15,150
Total CO #1.....	\$79,035
 Original proposal budget = \$151,559 (budget) – \$63,885 (unspent) ^a	 \$87,674

a. Original budget (\$151,559) approved on 9/11/2008 was under separate contract. Budget was reallocated to Change Order #1.

Mr. Loren Reinhold
City of Des Moines
January 20, 2017
Page 3 of 3



All services will be performed with our current Amec Foster Wheeler Time & Materials Services Agreement (US-03 T&M Rev 04/13), a copy of which is enclosed. To authorize our proposed scope of work, please have an appropriate authority sign the enclosed Addendum to Services and return a copy to us. Thank you!

Sincerely yours,
Amec Foster Wheeler Environment & Infrastructure, Inc.

Handwritten signature of Leah R. Vigoren in blue ink.

Leah R. Vigoren
Project Manager

Handwritten signature of John D. Long in blue ink.

John D. Long, LG, LHg
Senior Associate Hydrogeologist

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Enclosures: Addendum to Services
Cost Estimate Table
Services Agreement

Cost Estimate and Items		Rate	O&M Activities		Sampling Activities		ESTIMATED TOTAL	
			Units	Est. Cost	Units	Est. Cost	Units	Est. Cost
LABOR	Principal	\$ 250.00		\$ -		\$ -	0	\$ -
	Sr. Associate	\$ 200.00		\$ -		\$ -	0	\$ -
	Associate	\$ 185.00	4	\$ 740.00	10	\$ 1,850.00	14	\$ 2,590.00
	Senior Engineer/Scientist 2	\$ 165.00	10	\$ 1,650.00	40	\$ 6,600.00	50	\$ 8,250.00
	Senior Engineer/Scientist 1	\$ 150.00	5	\$ 750.00	5	\$ 750.00	10	\$ 1,500.00
	Staff Level III	\$ 135.00	40	\$ 5,400.00	150	\$ 20,250.00	190	\$ 25,650.00
	Staff Level II	\$ 115.00	120	\$ 13,800.00	100	\$ 11,500.00	220	\$ 25,300.00
	Staff Level I	\$ 110.00		\$ -		\$ -	0	\$ -
	Senior Technician	\$ 90.00		\$ -		\$ -	0	\$ -
	Technician 2	\$ 80.00		\$ -		\$ -	0	\$ -
	Technician 1	\$ 70.00		\$ -		\$ -	0	\$ -
	Technical Editor	\$ 110.00		\$ -		\$ -	0	\$ -
	Drafter	\$ 105.00	10	\$ 1,050.00	20	\$ 2,100.00	30	\$ 3,150.00
	Project Assistant	\$ 75.00	5	\$ 375.00	10	\$ 750.00	15	\$ 1,125.00
Clerical/word processing	\$ 65.00	5	\$ 325.00	20	\$ 1,300.00	25	\$ 1,625.00	
DIRECT COST	Mileage/per mile	\$ 0.59	150	\$ 88.50	150	\$ 88.50	300	\$ 177.00
				\$ -		\$ -	0	\$ -
	Office overhead on staff (6%)			\$ 1,445.40		\$ 2,711.31	0	\$ 4,156.71
	Subcontractor handling (15%)			\$ 1,500.00		\$ 2,280.00	0	\$ 3,780.00
CONTRACTOR COST	Laboratory	\$ 1,600.00		\$ -	8	\$ 12,800.00	8	\$ 12,800.00
	Sampling supplies (pid, water level, flow through cell,	\$ 300.00		\$ -	8	\$ 2,400.00		
	Misc. O&M	\$10,000.00	1	\$ 10,000.00		\$ -	1	\$ 10,000.00
	Total labor - hours			199		355		554
	Total labor - costs			\$ 24,090.00		\$ 45,100.00		\$ 69,190.00
	Total direct costs			\$ 3,033.90		\$ 5,079.81		\$ 8,113.71
	Total subcontractors			\$ 10,000.00		\$ 15,200.00		\$ 25,200.00
	Total Cost			\$ 37,123.90		\$ 65,379.81		\$ 102,503.71



**SERVICES AGREEMENT
(Time and Materials)**

THIS AGREEMENT (the "Agreement"), effective this ____ day of _____, 20__, is made by and between Amec Foster Wheeler Environment & Infrastructure, Inc., a Nevada corporation, with an address at 11810 North Creek Parkway N., Bothell, WA 98011 ("AmecFW") and City of Des Moines, Department of Public Works, with an address at 21650 11th Avenue South, Des Moines, WA 98198 ("CLIENT").

NOW, THEREFORE, in consideration of the mutual undertakings and subject to the terms set forth below and intending to be legally bound, the parties agree as follows:

1. SCOPE OF SERVICES: This Agreement sets forth the terms and conditions pursuant to which AmecFW will provide CLIENT services (the "Services") as described in its proposal, dated January 20, 2017, attached as Exhibit 1.

2. COMPENSATION: AmecFW will be compensated in US dollars for its Services on a time-and-materials basis.

AmecFW shall be reimbursed for all hours worked, all applicable taxes, and other costs incurred at the rates and terms set forth on Exhibit 1. Should the total cost of AmecFW's performance be greater than the estimated amount, AmecFW will notify CLIENT and provide a revised estimate for CLIENT's approval. In such event, continued performance is subject to additional funding as mutually agreed.

In addition to the amount payable for services, CLIENT assumes full responsibility for the payment of any applicable sales, use, or value-added taxes under this Agreement, except as otherwise specified. If Services are required to be provided in any foreign jurisdiction (i.e. – outside the US), CLIENT shall compensate AmecFW for any and all additional taxes, penalties, duties, levies or other charges by any governmental authority assessed or imposed in relation to this Agreement or the Services or any part thereof, which exceed those imposed in the US and whether assessed or imposed on AmecFW, its employees, its subcontractors or otherwise.

Invoices will be submitted at least monthly for Services rendered. Terms of payment are net thirty (30) days from date of invoice with a one and one-half percent (1.5%) per month late fee on balances past due. Interest shall be computed at 31 days from the date of invoice. In addition, any collection fees, attorneys' fees, court costs, and other related expenses incurred by AmecFW in the collection of delinquent invoice amounts shall be paid by CLIENT.

Payment will be made to AmecFW at the address specified on AmecFW's invoice.

If CLIENT reasonably objects to all or any portion of an invoice, CLIENT shall notify AmecFW of that fact in writing within ten (10) days from the date of receipt of AmecFW's invoice, give reasons for the objection, and pay that portion of the invoice not reasonably in dispute. Failure of CLIENT to provide such written notice within the allowed ten (10) day period shall be deemed to be a waiver of all objections to that invoice.

CLIENT's payment shall represent CLIENT's acceptance of the Services invoiced by AmecFW. AmecFW may suspend performance of Services under this Agreement if: (i) CLIENT fails to make payment in accordance with the terms hereof, or (ii) AmecFW reasonably believes that CLIENT will be unable to pay AmecFW in accordance with the terms hereof and notifies CLIENT in writing prior to such suspension of Services. Such suspension shall continue until AmecFW has been paid in full for all balances past due including applicable service charges and CLIENT provides AmecFW with adequate assurance of CLIENT's ability to make future payments in accordance with the terms hereof. If any such suspension causes an increase in the time required for the performance of any part of the Services, the performance schedule and/or period for performance shall be extended for a period of time equal to the suspension period.

The rates stated in the Proposal or included in Exhibit 1 shall be the basis for determining AmecFW's compensation for any Services. After January 1 of each subsequent calendar year, the rates may be increased by AmecFW up to an overall average increase of five percent (5%); provided that an overall average increase in excess of five percent (5%) shall be subject to CLIENT's approval. AmecFW shall provide CLIENT with thirty (30) days advance notice of any change in rates.

3. STANDARD OF CARE: AMECFW will perform the Scope of Services specified utilizing that degree of skill and care ordinarily exercised under similar conditions by reputable members of AmecFW's profession practicing in the same or similar locality at the time of performance. NO OTHER WARRANTY, GUARANTY, OR REPRESENTATION, EXPRESS OR IMPLIED, IS MADE OR INTENDED IN THIS AGREEMENT, OR IN ANY COMMUNICATION (ORAL OR WRITTEN), REPORT, OPINION, DOCUMENT, OR INSTRUMENT OF SERVICE, AND THE SAME ARE SPECIFICALLY DISCLAIMED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

4. INDEPENDENT CONTRACTOR: AmecFW shall be fully independent and shall not act, except as permitted herein, as an agent or employee of CLIENT. AmecFW shall be solely responsible for its employees and for their compensation, benefits, contributions, and taxes, if any.

Unless otherwise agreed to in writing by AmecFW and CLIENT, neither party shall directly or indirectly solicit, hire or retain, or knowingly cause a third party to solicit, hire or retain, during the term of this Agreement and for a period of one (1) year after the date on which this Agreement terminates, any employee of the other party who works on the preparation of the Proposal or otherwise performs Services under or in connection with this Agreement. Nothing herein shall prevent either party from hiring any individual who responds to a general advertisement for services.

5. INSURANCE: AmecFW will maintain insurance for this Agreement in the following types and limits: (i) worker's compensation insurance as required by applicable law, (ii) comprehensive general liability insurance (CGL) (\$1,000,000 per occurrence / \$2,000,000 aggregate), and (iii) automobile liability insurance for bodily injury and property damage (\$1,000,000 CSL).

6. CHANGES: CLIENT may order changes within the general scope of the Services by altering, adding to, or deleting from the Services to be performed. Work beyond the scope of services or re-doing any part of the project through no fault of AmecFW, shall constitute extra work and shall be paid for on a time-and-materials basis in addition to any other payment provided for in this Agreement.

Should AmecFW encounter conditions which were (i) not reasonably anticipated, including, but not limited to, changes in applicable law, (ii) subsurface or otherwise concealed physical conditions that differ materially from those indicated in this Agreement or (iii) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in activities of the character contemplated by this Agreement, AmecFW shall promptly provide notice to CLIENT before the conditions are disturbed. CLIENT shall promptly investigate such conditions. If, in AmecFW's reasonable opinion, the conditions cause an increase or decrease in AmecFW's cost of, or time required for, performance of any part of its Services, CLIENT shall issue a Change Order with an equitable adjustment in AmecFW's compensation, schedule, or both. In the event no Change Order is agreed to, AmecFW reserves the right to either (i) suspend its performance until a Change Order is agreed to or (ii) discontinue its performance and terminate this Agreement.

7. FORCE MAJEURE: Should performance of Services by AmecFW be affected by causes beyond its reasonable control, Force Majeure results. Force Majeure includes, but is not restricted to: acts of God; acts of a legislative, administrative or judicial entity; acts of contractors other than contractors engaged directly by AmecFW; earthquakes; fires; floods; labor disturbances; epidemics; and unusually severe weather. AmecFW will be granted a time extension and the parties will negotiate an equitable adjustment to the price of any affected Services, where appropriate, based upon the effect of the Force Majeure on performance by AmecFW.

8. INSTRUMENTS OF SERVICE: All reports, drawings, plans, or other documents (or copies) furnished to AmecFW by the CLIENT, shall at CLIENT's written request, be returned upon completion of the Services hereunder; provided, however, that AmecFW may retain one (1) copy of all such documents. All reports, drawings, plans, documents, software, source code, object code, field notes and work product (or copies thereof) in any form prepared or furnished by AmecFW under this Agreement are instruments of service. Exclusive ownership, copyright and title to all instruments of service remain with AmecFW.

CLIENT agrees as follows: (i) the instruments of service (a) may be used and relied upon only by CLIENT and, subject to the terms of this Agreement, its design team solely for the design of the Project, (b) will not be used other than for the Project, but may be submitted for any necessary regulatory approval, (c) may be based in part or in whole on facts and/or assumptions provided to, but not independently verified by, AmecFW and (d) will reflect AmecFW's findings as to conditions that existed only at the time the Services were performed; (ii) AmecFW (a) makes no representations as to any facts or assumptions provided to, but not independently verified by, AmecFW and (b) may rely on all of the information and data provided by CLIENT to AmecFW being accurate and complete; (iii) any third party who wishes to rely on any instruments of service must first sign AmecFW's Reliance Letter Agreement; and (iv) if CLIENT requests instruments of service on electronic media, the electronic copy may be inaccurate or incomplete and the document retained by AmecFW will be the official document, and any modification(s) of the electronic copy made by CLIENT will be at its own risk. CLIENT hereby releases, defends, indemnifies, and holds harmless AmecFW from and against all liabilities asserted against, or incurred by, AmecFW related to the breach by CLIENT of any of the foregoing agreements; provided, if CLIENT is a governmental entity, it has no obligation to defend or indemnify AmecFW.

9. CLIENT'S RESPONSIBILITIES: CLIENT agrees to: (i) provide AmecFW all available material, data, and information pertaining to the Services, including, without limitation, plot plans, topographic studies, hydrologic data and previous soil and geologic data including borings, field or laboratory tests, written reports, the composition, quantity, toxicity, or potentially hazardous properties of any material known or believed to be present at any site, any hazards that may be present, the nature and location of underground or otherwise not readily apparent utilities, summaries and assessments of the site's past and present compliance status, and the status of any filed or pending judicial or administrative action concerning the site and shall immediately transmit to AmecFW any new information that becomes available or any changes in plans; (ii) convey and discuss such materials, data, and information with AmecFW; and (iii) ensure cooperation of CLIENT's employees.

CLIENT shall indemnify, defend, and save AmecFW harmless from and against any liability, claim, judgment, demand, or cause of action arising out of or relating to: (i) CLIENT's breach of this Agreement; (ii) the negligent acts or omissions of CLIENT or its employees, contractors, or agents; (iii) any allegation that AmecFW is the owner or operator of a site, or arranged for the treatment, transportation or disposal of hazardous materials, including all adverse health effects thereof and (iv) site access or damages to any subterranean structures or any damage required for site access.

In addition, where the Services include preparation of plans and specifications and/or construction oversight activities for CLIENT, CLIENT agrees to have its construction contractors agree in writing to indemnify and save harmless AmecFW from and against loss, damage, injury, or liability attributable to personal injury or property damage arising out of or resulting from such contractors' performance or nonperformance of their work.

10. SITE ACCESS: CLIENT shall at its cost and at such times as may be required by AmecFW for the successful and timely completion of Services: (i) provide unimpeded and timely access to any site, including third party sites if required (ii) provide an adequate area for AmecFW's site office facilities, equipment storage, and employee parking; (iii) furnish all construction utilities and utilities releases necessary for the Services; (iv) provide the locations of all subsurface structures, including piping, tanks, cables, and utilities; (v) approve all locations for digging and drilling operations; and (vi) obtain all permits and licenses which are necessary and required to be taken out in CLIENT's name for the Services. AmecFW will not be liable for damage or injury arising from damage to subsurface structures that are not called to its attention and correctly shown on the plans furnished to AmecFW in connection with its work.

11. WARRANTY OF TITLE, WASTE OWNERSHIP: CLIENT has and shall retain all responsibility and liability for the environmental conditions on the site. Title and risk of loss with respect to all materials shall remain with CLIENT. If the samples or wastes resulting from the Services contain any contaminants, AmecFW, as the CLIENT's agent, and at CLIENT's direction and expense, will either (i) return such samples or wastes to, or leave them with, CLIENT for appropriate disposal or (ii) using a manifest signed by CLIENT as generator and arranger, coordinate the transport of such samples or wastes to an approved facility selected by CLIENT for final disposal, using a transporter selected by CLIENT. At no time will AmecFW assume possession or title, constructive or express, to any such samples or wastes. CLIENT agrees to pay all costs associated with the storage, transport, and disposal of samples and wastes.

12. LIMITATION OF LIABILITY: As part of the consideration AmecFW requires for provision of the Services indicated herein, CLIENT agrees that any claim for damages filed against AmecFW by CLIENT or any contractor or subcontractor hired directly or indirectly by CLIENT will be filed solely against AmecFW or its successors or assigns and that no individual person shall be made personally liable for damages, in whole or in part.

CLIENT's sole and exclusive remedy for any alleged breach of AmecFW's standard of care hereunder shall be to require AmecFW to re-perform any defective Services. All claims by CLIENT shall be deemed relinquished unless filed within one (1) year after substantial completion of the Services.

TO THE MAXIMUM EXTENT PERMITTED BY LAW, CLIENT AGREES THAT THE LIABILITY OF AMECFW TO CLIENT FOR ANY AND ALL CAUSES OF ACTION, INCLUDING, WITHOUT LIMITATION, CONTRIBUTION, ASSERTED BY CLIENT AND ARISING OUT OF OR RELATED TO THE NEGLIGENT ACT(S), ERROR(S) OR OMISSION(S) OF AMECFW IN PERFORMING SERVICES, SHALL BE LIMITED TO FIFTY THOUSAND DOLLARS (\$50,000) OR THE TOTAL FEES ACTUALLY PAID TO AMECFW BY CLIENT UNDER THIS AGREEMENT WITHIN THE PRIOR ONE (1) YEAR PERIOD, WHICHEVER IS LESS ("LIMITATION"). CLIENT HEREBY WAIVES AND RELEASES (I) ALL PRESENT AND FUTURE CLAIMS AGAINST AMECFW OTHER THAN THOSE DESCRIBED IN THE PRECEDING SENTENCE, AND (II) ANY LIABILITY OF AMECFW IN EXCESS OF THE LIMITATION.

In consideration of the promises contained herein and for other separate, valuable consideration, the receipt and sufficiency of which are hereby acknowledged, CLIENT acknowledges and agrees that (i) but for the Limitation, AmecFW would not have performed the Services, (ii) it has had the opportunity to negotiate the terms of the Limitation as part of an "arms-length" transaction, (iii) the Limitation amount may differ from the amount of professional liability insurance carried by AmecFW, (iv) the Limitation is merely a limitation of, and not an exculpation from, AmecFW's liability and does not in any way obligate CLIENT to defend, indemnify or hold harmless AmecFW, (v) the Limitation is an agreed remedy, and (vi) the Limitation amount is neither nominal nor a disincentive to AmecFW performing the Services in accordance with the Standard of Care.

AmecFW and CLIENT shall each waive any right to recover from the other party for any special, incidental, indirect, or consequential damages (including lost profits and loss of use) incurred by either AmecFW or CLIENT or for which either party may be liable to any third party, which damages have been or are occasioned by Services performed or reports prepared or other work performed hereunder.

CLIENT agrees that the damages for which AmecFW shall be liable are limited to that proportion of such damages which is attributable to AmecFW's percentage of fault subject to the other limitations herein.

13. ASSIGNMENT AND SUBCONTRACTING: Neither party shall assign its interest in this Agreement without the written consent of the other, except that AmecFW may assign its interest in the Agreement to related or affiliated companies of AmecFW or subcontract portions of the Services to a qualified subcontractor without the consent of CLIENT.

If services are required in New York, AmecFW will arrange for such services to be provided by an associated firm and this agreement, where required, shall be deemed to be directly between the CLIENT and the licensed firm for all purposes related to the specific scope of services. AmecFW shall retain responsibility in accordance with this Agreement for all services performed.

14. COST ESTIMATES: If included in the Services, AmecFW will provide cost estimates based upon AmecFW's experience on similar projects, which are not intended for use by CLIENT or any other party in developing firm budgets or financial models, or in making investment decisions. Such cost estimates represent only AmecFW's judgment as a professional and, if furnished, only for CLIENT's general guidance and are not guaranteed as to accuracy.

15. DISPUTE RESOLUTION: If a claim, dispute, or controversy arises out of or relates to the interpretation, application, enforcement, or performance of Services under this Agreement, AmecFW and CLIENT agree first to try in good faith to settle the dispute by negotiations between senior management of AmecFW and CLIENT. If such negotiations are unsuccessful, AmecFW and CLIENT agree to attempt to settle the dispute by good faith mediation if both parties agree. If the dispute cannot be settled through mediation, and unless otherwise mutually agreed, the dispute shall be settled by litigation in an appropriate court in the state of the AmecFW office entering into this Agreement. **TO THE EXTENT NOT PROHIBITED BY LAW, THE PARTIES HEREBY WAIVE TRIAL BY JURY WITH RESPECT TO ANY ACTION OR PROCEEDING BROUGHT IN CONNECTION WITH THIS AGREEMENT.** Except as otherwise provided herein, each party shall be responsible for its own legal costs and attorneys' fees.

16. TERM AND TERMINATION: The term of this Agreement shall commence as of the day and year first written above, and shall continue in effect until terminated by either party as provided herein. Either party may terminate this Agreement at any time, with or without cause, by providing not less than ten (10) days advance written notice to the other party. AmecFW may terminate this Agreement immediately in writing if CLIENT becomes insolvent, enters bankruptcy, receivership, or other like proceeding (voluntary or involuntary) or makes an assignment for the benefit of creditors.

Notwithstanding the termination of this Agreement, this Agreement will survive as to the Services provided prior to the Agreement's effective termination date, until all of the rights and obligations of both parties thereunder have been fulfilled.

CLIENT shall compensate AmecFW for all Services performed hereunder through the date of any termination and all reasonable costs and expenses incurred by AmecFW in effecting the termination, including non-cancelable commitments and demobilization costs.

17. NOTICE: Any notice required under this Agreement will be in writing, addressed to the appropriate party at the address set forth in the introductory paragraph of this Agreement (or such other address as the parties may designate from time to time in writing) and given personally, by registered or certified mail postage prepaid, or by a commercial courier service. Notices shall be effective: (a) upon receipt after being delivered personally, (b) 3 days after being deposited in the mail as described above, or (c) 2 days after being deposited with a commercial courier service.

18. CONFIDENTIALITY: Both parties shall keep all information and data provided by the other party pertaining to the Services strictly confidential, and unless such information and data is already in the public domain on the date of the Agreement, neither party shall publish or otherwise disseminate such information and data to any third party without receiving written permission to do so from the source of such information or data. If disclosure of such confidential information is required by law or legal process, the party obligated to disclose such information should provide reasonable advance notice to the party that provided such information.

19. WAIVER: The failure of either AmecFW or CLIENT in any one or more instances to enforce one or more of the terms or conditions of this Agreement or to exercise any right or privilege in this Agreement or the waiver by AmecFW or CLIENT of any breach of the terms or conditions of this Agreement shall not be construed as thereafter waiving any such terms, conditions, rights, or privileges, and the same shall continue and remain in force and effect as if no such failure to enforce had occurred.

20. SEVERABILITY AND HEADINGS: Every term or condition of this Agreement is severable from others. Notwithstanding any possible future finding by a duly constituted authority that a particular term or provision is invalid, void, or unenforceable, this Agreement has been made with the clear intention that the validity and enforceability of the remaining parts, terms, and provisions shall not be affected thereby. The headings used in this Agreement are for general reference only and do not have special significance.

21. GOVERNING LAWS/LANGUAGE: This Agreement shall be governed and construed in accordance with the laws of the state of the AmecFW office entering into this Agreement. All communications relating to or arising out of this Agreement shall be in the English language.

22. NONDISCRIMINATION AND AFFIRMATIVE ACTION: AmecFW agrees to comply with Executive Order 11246 and the applicable federal regulations pertaining to nondiscrimination and affirmative action, including the Equal Opportunity Clause, the Affirmative Action Clause for Handicapped Workers, and the Affirmative Action Clause for Disabled Veterans and Veterans of the Vietnam Era. Further, AmecFW agrees that its facilities are not segregated.

23. FIELD REPRESENTATION: The Services do not include supervision or direction of the means, methods or actual work of other consultants, contractors and subcontractors not retained by AmecFW. The presence of AmecFW's representative will not relieve any such other party from its responsibility to perform its work and services in accordance with its contractual and legal obligations and in conformity with the plans and specifications for the project. CLIENT agrees that each such other party will be solely responsible for its working conditions and safety on the site. AmecFW's monitoring of the procedures of any such other party is not intended to include a review of the adequacy of its safety measures. It is agreed that AmecFW is not responsible for safety or security at a site, other than for AmecFW's employees, and that AmecFW does not have the contractual duty or legal right to stop the work of others.

24. AUTHORIZATION TO SIGN: The person signing this Agreement warrants that he has authority to sign as, or on behalf of, the CLIENT for whom or for whose benefit AmecFW's services are rendered.

25. ANTI-BRIBERY: The Parties undertake to protect the standards of business practice of the other Party at all times and to act in such a way as to uphold the good name and reputation of the other Party and not to do or attempt to do any act or thing which is intended to and/or which in fact causes any damage to or brings discredit upon the other Party and, in particular, the Parties will not:

(a) Offer or give or agree to give to any director, officer, employee or agent of the other Party or any other entity any gift or consideration of any kind as an inducement or reward for doing or for forbearing to do or for having done or forborne to do any action in relation to the obtaining or execution of any contract or for showing or forbearing to show any favor or disfavor to any person in relation to any contract.

(b) Induce or attempt to induce any officer, servant or agent of any private or public body to neither depart from his duties to his employer nor be involved with any such arrangement.

26. ENTIRE AGREEMENT: The terms and conditions set forth herein constitute the entire understanding and agreement of AmecFW and CLIENT with respect to the Services. All previous proposals, offers, and other communications relative to the provisions of these Services are hereby superseded. Any modification or revision of any provision set forth herein or any additional provision contained in any purchase order, acknowledgment, or other form of the CLIENT is hereby superseded and expressly objected to by AmecFW and shall not operate to modify this Agreement. Should CLIENT utilize its purchase order or any other form to procure services, CLIENT acknowledges and agrees that its use of such purchase order or other form is solely for administrative purposes and in no event shall AmecFW be bound to any terms and conditions on such purchase order or other form, regardless of reference to (e.g. on invoices) or signature upon (e.g. acknowledgement) such purchase order or other form by AmecFW. CLIENT shall endeavor to reference this Agreement on any purchase order or other form it may issue to procure AmecFW services, but CLIENT's failure to do so shall not operate to modify this Agreement.

IN WITNESS WHEREOF, CLIENT and AmecFW have caused this Agreement to be executed by their respective duly authorized representatives as of the date first set forth above.

CLIENT

Amec Foster Wheeler Environment & Infrastructure, Inc.

By: _____

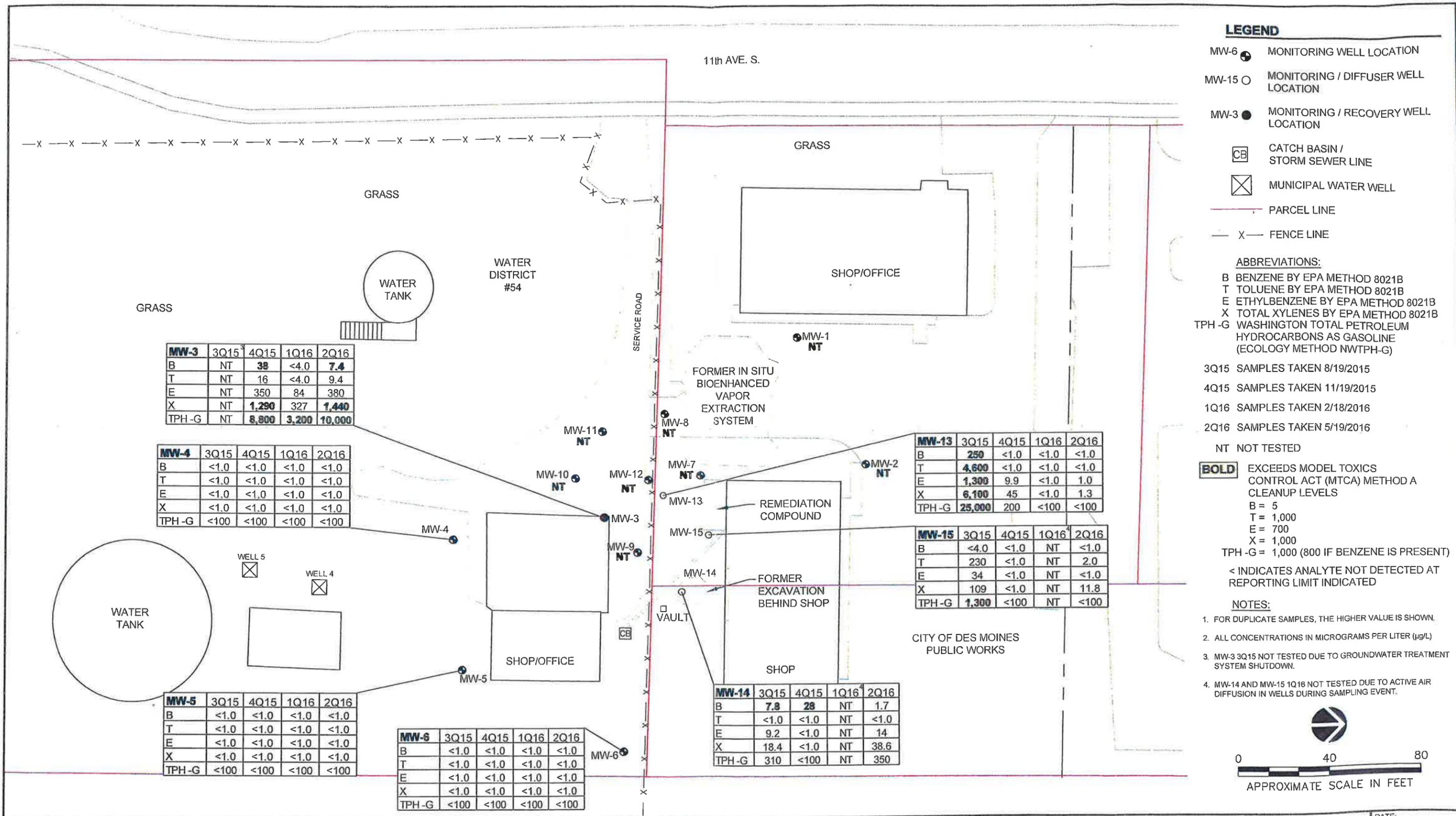
By: _____

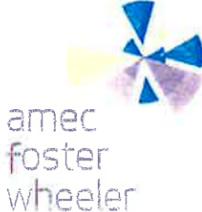
Name: _____

Name: _____

Title: _____

Title: _____



CLIENT: CITY OF DES MOINES 	 Amec Foster Wheeler Environment & Infrastructure, Inc. 600 University Street, Suite 600 Seattle, Washington 98101	DWN BY: APS CHK'D BY: LV DATUM: PROJECTION: SCALE: 1" = 40'	PROJECT: CITY OF DES MOINES PUBLIC WORKS FACILITY 21650 11th Avenue S, Des Moines, Washington	DATE: JULY 2016 PROJECT NO: 0-915-08307-S REV. NO: FIGURE No. 8
		TITLE: GROUNDWATER SAMPLE ANALYSIS MAP 2016 ANNUAL REPORT		