

Engineering Report  
For

**Riverside Extension Phase 2**  
Crossing the Hamilton Street Bridge Site (WDOE #3509)  
City of Spokane, Spokane County, Washington

COS Project No.: 2005264  
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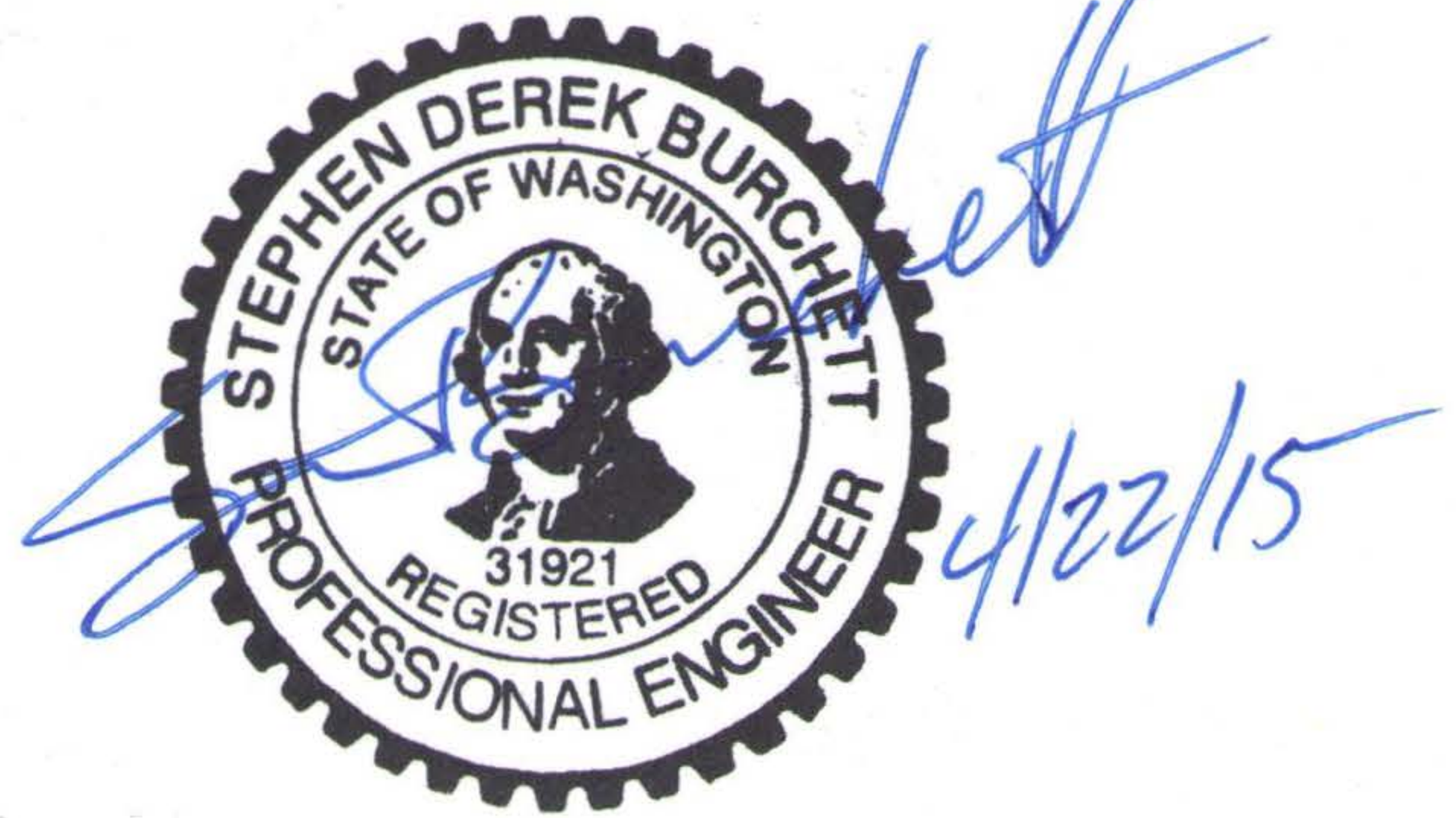
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# 1. INTRODUCTION

## 1.1. Project Overview and Study Purpose

The City of Spokane is proposing to construct the Riverside Extension Phase 2 project between Sherman Street to the intersection of Trent Avenue. Although the original project was titled Riverside Extension, the roadway has since been named Martin Luther King Jr. Way. For the purposes of this report, the roadway itself will hereafter be referred to as MLK Way.

The MLK Way project proposes construction of a new roadway section with supporting stormwater treatment and infiltration facilities, wet and dry new utility installation, and construction of a pedestrian pathway to provide pedestrian connectivity in the area.

A section of the proposed MLK Way road construction crosses the Department of Ecology (WDOE) Hamilton Street Bridge Site (Clean-up Site ID 3509), which is addressed as 111 N. Erie Street in Spokane, Washington. Cleanup activities for this site were conducted under the State of Washington, Spokane County Superior Court Consent Decree 02205445-0. Exhibit A from the Consent Decree provides the Hamilton Street Bridge Site limits. A copy of Exhibit A is provided in Appendix C.

Restrictive Covenants placed on the Hamilton Street Bridge (HSB) Site require that activity on the property that may release or expose contaminated soil or groundwater requires prior written approval by the WDOE. The purpose of this report is to provide project-specific stormwater design facility recommendations for the MLK Way that are in conformance with the WDOE institutional controls and that meet jurisdictional stormwater flow mitigation and pollutant treatment requirements.

## 1.2. Site Description

The Riverside Extension Phase 2 project is located within the Southeast Corner of Section 17 of Township 25 N., Range 43 E., W.M. within the City of Spokane, Washington. The project starts at the MLK Way/Sherman Street intersection and continues east and north to the Trent Avenue/Perry Street intersection. A section of the MLK Way project crosses the HSB Site and shall henceforth be referred to as the HSB – MLK Way project. That segment of the project is the subject of this report.

The western half of the HSB – MLK Way project is zoned general commercial (GC-150) and the western half is zoned as Heavy Industrial (HI). Exhibit A, which identifies the project location, is provided in Appendix A.

The project terrain is mostly flat with some rolling terrain that varies between 0.3 percent to over 7.0 percent and generally drains towards the north. Prior use of the property by the railroad and as a manufactured gas, coal tar processing facility has been well documented within WDOE reports.

### **1.3. Environmental Compliance**

The environmental analysis prepared for MLK Way was in compliance with WAC 197-11-960 and with Spokane Environmental Ordinance Section SMC 17E.050.310 (formerly Section 11.10.230(1)). A State Environmental Policy Act (SEPA) chapter 43.21C RCW Environmental Impact Statement (EIS) was prepared for the project and a classification Determination of Non-significance was recommended and accepted on November 8, 2007.

## **2. METHODOLOGY**

### **2.1. Compliance**

Environmental: The environmental analysis prepared for Riverside Extension Phase 2 in compliance with WAC 197-11-960 and with Spokane Environmental Ordinance Section SMC 17E.050.310.

Restrictive Covenants placed on the HSB Site state that any activity on the property that may result in the release or exposure to the environment of the contaminated soil or groundwater that was contained as part of the site Cleanup Action is prohibited without prior written approval by the WDOE. Proposed project actions will result in disturbance of contaminated soils that currently reside beneath a soil cap, or may encounter contaminated soils previously not identified.

Construction activities that may disturb the existing soil cap are grading and trenching for utility installation. It is anticipated that the disturbances will be localized in nature and the cap will be re-established once utility construction is completed. As such, the WDOE will be requested to review and approve proposed actions in conformance with the WDOE institutional controls and that meet jurisdictional stormwater flow mitigation and pollutant treatment requirements.

All contaminated soils and/or groundwater generated as a result of project activities must be handled, treated or disposed of in accordance with the restrictive covenants and with local, state, and federal regulations.

Site workers conducting approved activities that disturb contaminated soil beneath the soil cap must use appropriate personnel protective equipment as required by the Occupational Safety and Health Act (OSHA) [specifically CFR 1910.120] and the Washington Industrial Safety and Health Act (WISHA).

Drainage: The drainage design methodologies used in the preparation of this study are in compliance with the *Spokane Regional Stormwater Manual* (Reference 9, hereafter referred to as the Regional Stormwater Manual) and with the *Stormwater Management Manual for Eastern Washington* (Reference 10, hereafter referred to as the EW Stormwater Manual).

Drywell siting and design methodologies used are in accordance with the Washington State Department of Ecology *Guidance for UIC Wells that Manage Stormwater Manual* (reference 7, hereafter referred to as the UIC Stormwater Manual) and with the City of Spokane *Design Standards Manual* (Reference 8).

## 2.2. Hydrologic Modeling

**Modeling:** The Rational Method was used to calculate the peak flows and flow volume for the subsurface infiltration facilities. Flow volumes for the 100 minute design storm were calculated using the Modified Rational Method and were based upon the 10-year design storm peak flow rate derived from the Rational Method where:

$$Q_p = CIA \text{ (eqn. 5-10; Regional Stormwater Manual)}$$

Where:

$Q_p$  = peak flow rate (cfs)

C = runoff coefficient

I = rainfall intensity (in/hr)

A = drainage area (acres)

Basin cutoff points were established at high points within the terrain or at locations where the existing storm drain system grates would intercept the water quality treatment and 10-year design storm flows.

**Soils Information:** In situ soils information (including soil characteristics and infiltration rates) used in the stormwater design were obtained by field investigation and testing analysis that was conducted by Budinger and Associates (Appendix C). Soils within bio-infiltration treatment areas will be imported. Treatment soil characteristics were based upon product specifications.

During exploration and analysis for drywell design, several samples of the soils encountered were submitted for chemical analysis of HSB Site COC's. Shallow soils at the location of Elevated concentrations of Cyanide and cPAH's were encountered in shallow soils at the location of Swale and Drywell DW-M1. These soils will be removed and replaced with clean material during construction. Observations and test results indicate that deeper soils are not affected. Soil conditions will be further evaluated during drywell installation.

**Runoff Coefficient:** Runoff coefficients for the site were developed based on land use and were obtained from Table 5-5 of the Spokane Regional Stormwater Manual. All of the hydraulically connected impervious areas contributing to the stormwater treatment system were comprised of paved areas or of planting areas that lacked infiltration losses. A runoff coefficient for pavement for rolling terrain (2% - 10% slope) with a  $C_{10\text{-year}}$  value of 0.90 was selected to represent the contributing basin areas.

The existing ground had been graded and compacted by heavy equipment to encapsulate the HSB Site. Since this restricts the soils infiltration capabilities, the existing runoff conditions onsite are assumed to match the developed condition.

**Travel Time:** Travel time is defined as the time required for stormwater to move through a flow segment. Time of concentration is defined as the time measured from the center of mass of effective rainfall to the time to peak of the outflow hydrograph. Due to the short basin lengths, a minimum value of 5 minutes was assigned to each of the subbasins.

### **2.3. Hydraulic Modeling**

**Drywells:** Proposed drywell design and siting is in accordance with the Washington State Department of Ecology *Guidance for UIC Wells that Manage Stormwater* dated December 2006 and with the City of Spokane Design Manual dated January 2009.

## **3. EXISTING CONDITION**

### **3.1. Definition of Existing Condition**

HSB – MLK Way is located between approximately 110 to 300 feet south of the Spokane River. The existing terrain is flat with rolling sections and slopes range between 1 and 30 percent to the north. Adjacent land is zoned both as commercial and heavy industrial.

### **3.2. Existing Drainage Condition Discussion**

During the existing condition storm runoff generated within the HSB – MLK Way and offsite drainage tributary surface flows north towards the Spokane River. While the existing property is undeveloped, it has been graded and covered with a compacted layer (i.e., soil cap) that encapsulates contaminated layers. Some infiltration may occur on the Front Avenue right-of-way and in the highly permeable soils along the Spokane River.

Undeveloped land to the south of the project is owned by BNSF railroad and no future development is planned on this property. Property to the north of the proposed roadway is currently owned by Spokane River Properties. While this area may be developed as for either commercial or industrial uses, the remaining property is downgradient of HSB – MLK Way and not hydraulically connected to the project. In accordance with the Eastern Washington Stormwater Manual and the Regional Stormwater Manual, the hydraulically unconnected pollutant generating areas were removed from the contributing basin delineation. A summary of the existing drainage conditions is provided below:

Stormwater: Surface stormwater generated by onsite basins surface flow to the north. A portion of the stormwater infiltrates into the permeable in situ soils and the remaining flows drain towards the Spokane River.

Surface Water: The Spokane River is located approximately 110 to 300 feet north of the proposed MLK Way. No other bodies of water reside near the proposed project.

Groundwater: The HSB-MLK Way project is located within the Spokane County Critical Aquifer Recharge Area (CARA) and is subject to Spokane Environmental Ordinance Section SMC 17E.050.310. The project is not located within a wellhead protection area.

Since stormwater will be routed off site or infiltrated to permeable soils, there should be no significant hydrologic change between the existing and proposed condition or impact to downgradient properties. Consequently, hydrologic calculations are provided in the Proposed Condition section of this report.

### **3.3. Existing Environmental Condition Discussion**

The MLK Way Phase 2 SEPA checklist was forwarded for public notification and processing on November 8, 2007. The 30-day period has since passed without comment. The document contained an evaluation of the project impacts to such items as air quality, surface and groundwater, plant and animal species, environmental health, and historic and cultural preservation. A copy of the SEPA checklist is available at the City of Spokane Engineering Services office.

A summary of the pertinent existing environmental conditions is provided below:

Contaminated Soils: Contaminated soil areas on the project are encapsulated by the soil cover. The areas of PAH-affected soils are located as shown on Figure 7 of the Hamilton Street Bridge Site Enforcement Order DE-1533. During project activities, additional spurious contaminated soil may be encountered or exposed. When possible, the extent of these soils will be identified so that site records may be updated.

Approximately 18,000 cubic yards of excess fill material from Phase 1 of the MLK Way project has been placed on the east side of the HSB site for use on the Phase 2 project. Analytical results from the sampling and analysis of nine samples collected from finer fractions of this fill material indicate that while the stockpiled material does contain some PAH's, it is below the HSB site cleanup level of 1. Fill material from the project site and imported clean fill material will be used to further encapsulate the contaminated soils located on the HSB site. Fill materials and soils on the project will be placed in accordance with the Consent Decree for the property. A copy of the WDOE email dated 2/17/15 is provided in the appendix for reference.

During some project activities (such as swale or drywell construction and installation), additional (not currently identified) contaminated soils may be encountered. If this occurs, or if contaminated soils beneath the soil cap are encountered, project personnel must adhere to the site health and safety plan which may require compliance with HAZWOPER (CFR 1910.120) requirements depending on the specific work performed. Additionally, the extent of any contaminated soil should be identified to update site records. As indicated above, all contaminated soils and/or groundwater generated during project activities must be treated and disposed of in accordance with local, state, and federal regulations.



Groundwater underlying some portions of the HSB-MLK Way project is contaminated with PAHs and metals exceeding site cleanup levels. However, project activities are not anticipated to result in any releases to groundwater, nor conducted to depths where groundwater will be encountered.

## **4. PROPOSED CONDITION DESIGN**

### **4.1. Definition of Proposed Condition**

The proposed condition assumes that MLK Way Phase 2 is fully constructed as an arterial street in accordance with the attached plan sheets. The roadway has been constructed and the area upstream (BNSF) remains undeveloped.

### **4.2. Proposed Condition**

Under the proposed condition, MLK Way Phase 2 has been constructed. BNSF property to the south is fenced, but remains undeveloped. Spokane River Properties to the south may or may not be developed.

#### Proposed Condition Hydrologic Parameters:

Stormwater from the HSB-MLK Way roadway surface flows into curb cuts or is captured by storm drains. The flows are then conveyed into lined stormwater treatment areas.

Most of the stormwater from the newly constructed roadway will be collected using bio-infiltration (208 swales) and then conveyed to drywells. A 10-year design storm (the flow control facility storm) peak flow and volumes were calculated and assessed for each infiltration system proposed.

Due to the potential for contaminated soils at the MLK Way/Erie Street intersection, a suitable stormwater infiltration site was not located within City right-of-way. Stormwater from this area will be fully treated and conveyed to an existing 69 inch sanitary sewer main, located in Erie Street.

Basin cutoff points were established at high points within the terrain or at locations where the proposed storm drain system grates would intercept flows from the water quality treatment and 10-year design storms. The storm flows for each basin and treatment area were evaluated by subbasin areas.

### **4.3. Proposed Condition Flow Summary**

A summary of the proposed condition 10-year design storm flows rates are presented below in Table 3. A copy of the 10-year design flow calculations are provided in Appendix B. All stormwater will be treated using bio-infiltration, in accordance with the SRSM, prior to UIC disposal.

<b>Table 3: 10-Year Proposed Condition Flow Summary</b>				
Subbasin*	Area (acres)	Reqd. Vol <sub>10</sub> (cf)	Drywell Facility Name	Drywell Outflow Rate Q <sub>10</sub> (cfs)
Area 1	0.73	509	WSU-DW 1 & 2	0.6
Area 2	0.15	0	DW D1-M1	1.0
Area 3	0.14	0	DW D2-M2	1.0

\* Refer to Exhibits E1 and E2 for subbasin characteristics.

#### **4.4. Proposed Condition Environmental Discussion**

A summary of the construction phase and proposed environmental conditions are listed below:

Placement of Fill and Soil Encapsulation: Fill material will be transferred to the HSB site for general grading and encapsulation purposes. Fill materials and soils on the project will be placed in accordance with the Consent Decree for the property.

Encountering Contaminated Soil during trenching for utility installation: It is possible that contaminated soil will be encountered during trenching for utility installation. The potential exists that contaminated soil may be encountered within the HSB site. If this occurs within an undocumented area, the extent of this contamination should be documented for inclusion in site records. If the location of these drainage improvements can be modified (with the consent of engineering/design staff) to be outside any area of observed soil contamination, then the potential of future impacts from these improvements can be minimized.

If the construction of the utilities cannot be moved outside of contaminated soil and/or if any removal of contaminated soil is necessary, or if excavation below the soil cover is necessary, invasive work must be completed by HAZWOPER-trained personnel. Furthermore, any contaminated soil generated as a result of construction activities that cannot be replaced beneath the cap must be treated/disposed of in accordance with local, state, and federal regulations.

If excavations are anticipated to occur at depths that encounter contaminated soil beneath the soil cap or are greater than 2 feet below existing grade where the soil cap is present, the soil cap material must be removed, set aside, and then re-placed once excavation is completed to maintain the integrity of the soil cap.

During construction, implementation of routine mitigation practices to reduce/eliminate stormwater impacts to the project site will be required and must be monitored throughout construction in accordance with applicable local, state, and federal requirements.

Design and construction of the project is intended to prevent stormwater infiltration in areas of the HSB site that could result in a future release of contaminants to soil and/or site groundwater. As such, drywell locations and swales have been designed to route stormwater away from in-place contaminated soils and infiltrate where future impacts will be minimized to the site.

## **5. CONCLUSIONS & RECOMMENDATIONS**

1. The project site is not located within a FEMA designated SFHA.
2. A State Environmental Policy Act (SEPA) chapter 43.21C RCW Environmental Impact Statement (EIS) was submitted on November 8, 2007. A classification Determination of Non-significance was recommended and accepted and the 30-day public notification period has since passed.
3. Stormwater from the newly constructed roadway will be treated using bio-infiltration in accordance with the Spokane Regional Stormwater Manual.
4. Treated stormwater will be conveyed to UIC facilities for infiltration. The drywells will be registered with the WDOE. The UIC facilities have been sited hydraulically downstream of the PAH-contaminated soil areas as delineated within WDOE Enforcement Decree DE-1533.
5. Stormwater from the MLK Way/Erie Street intersection cannot be infiltrated due to extensive contamination in the area. Stormwater in this area will be treated and conveyed to an existing 69-inch sanitary sewer main, located in Erie Street.
6. Proposed project activities will result in stormwater for infiltration/treatment being routed from areas of known contamination beneath a soil cap and will reduce the overall potential for leaching of contaminants to subsurface soils and groundwater.
7. Utility trenching and installation is proposed with this project. Contaminated soils excavated from the trenches will be replaced beneath the cap. In addition, these soils will be capped by the new roadway, greatly reducing future, potential infiltration of contaminants. Materials that are not replaced beneath the cap will be disposed of at a permitted facility.
8. Proposed project activities are not anticipated to result in any permanent degradation of Restrictive Covenants for the HSB site. Once completed, the project should enhance future development opportunities of this vicinity in accordance with stakeholder desires..

## 6. REFERENCES

1. *State of Washington Spokane County Superior Court Decree No. 02205445-0. Filed September 12, 2002.*
2. Periodic Review Report for the Hamilton Street Bridge Site. Washington State Dept. of Ecology, August 2010.
3. .MLK Phase 2 Geotechnical and Hydrogeological Exploration and Analysis Memorandum. Budinger and Associates, March 23, 2015.
4. Analytical Report MLK CIPP Pipe location. Test America, June 2, 2014.
5. MLK Phase 2 Hamilton Street Bridge Site (Construction Recommendations) Memorandum. Budinger and Associates, September 9, 2013.
6. *Guidance for UIC Wells that Manage Stormwater.* Washington State Dept. of Ecology, December 2006.
7. *City of Spokane Design Standards Manual.* City of Spokane, February 2007.
8. *Spokane Regional Stormwater Manual*, prepared by Spokane County, The City of Spokane, and The City of Spokane Valley, dated April 2008.
9. *Stormwater Management Manual for Eastern Washington.* Washington State Dept. of Ecology, September 2004.