Operation and Maintenance Plan
Hamilton Street Bridge Site
Spokane, Washington

January 8, 2004

Prepared for

Avista Corporation and
Burlington Northern Santa Fe Railroad Company

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1.0 INTRODUCTION

The Avista Corporation (Avista Corp) and The Burlington Northern and Santa Fe Railway Company (BNSF) (The Companies) entered into a Consent Decree (Consent Decree No. 02205445-0) with the Washington State Department of Ecology (Ecology) to remediate the Hamilton Street Bridge Site (Site). Landau Associates has prepared this Operation and Maintenance Plan (OMP) on behalf of the Companies to meet the requirements of the Consent Decree, the Model Toxics Control Act (MTCA), and specifically Section 173-340-400 (4)(c) (Ecology 1996) of the Washington Administrative Code (WAC).

1.1 OBJECTIVES

The overall objective of this plan is to provide a reference document for the Companies and Ecology that summarizes the management, inspection, repair, and reporting requirements associated with the long-term operation and maintenance of the cleanup action facilities at the Site. Specific objectives of the plan are to:

- Identify the organizations and personnel responsible for managing, operating, and maintaining the facilities.
- Identify general tasks, frequency, and responsibilities for maintenance, to ensure ongoing performance as required to maintain their intended design function.
- Specify the type and frequency of reports and associated recordkeeping procedures.
- Identify emergency procedures related to operation and maintenance of the soil cap, stormwater drainage facilities, shoreline bioengineering system, and monitoring wells.

1.2 BACKGROUND

1.2.1 SITE DESCRIPTION

The Site is located at 111 North Erie Street in Spokane, Washington (Figures 1 and 2), and includes the BNSF property [including a portion of which was formerly leased by the American Tar Company (ATC)], the former Spokane Manufactured Gas Plant (SGP), and Chicago Milwaukee & St. Paul Railroad (CM&SPR) properties which are now owned by Spokane River Properties, Limited (SRP) (Figure 3).

Brown Building Materials currently operates a building materials salvage and sales operation on the Site and has future plans to develop the SRP property with offices and paved parking. The Site is transected, roughly north-south, by the James Keefe (Hamilton Street) Bridge which is elevated high

above ground surface on concrete piers with spread footings. A 60-inch diameter sanitary sewer line crosses beneath the Site in a southwest-northeast alignment.

1.2.2 SITE HISTORY

Between approximately 1905 and 1948, manufactured coal gas and carbureted water gas was produced on the former SGP property. On June 3, 1958, Avista Corp (formerly The Washington Water Power Company) merged with the Spokane Natural Gas Company (formerly the Spokane Gas & Fuel Company) and dispensed natural gas from the Site until 1962 or 1963. Mr. Richard Brown established Brown Building Materials on the Site, leasing the former SGP property from Avista Corp from 1963 until March 1978, when he purchased the property. Mr. Brown conveyed the property to SRP, of which Mr. Brown is the general partner, in January 1982.

During the operation of the manufactured gas plant, coal tar, a by-product of coal gas production, reportedly was conveyed to a coal tar processing plant and distribution facility located on a parcel leased from the Northern Pacific Railroad (contemporary BNSF) adjacent to the south side of the former SGP property. The C.G. Betts Company operated the facility until the early 1930s when the operations were taken over by the ATC. The ATC utilized the facility until 1967, reportedly shipping tar to the Site from Seattle after the former SGP was shut down. Mr. Brown leased the ATC property from the BNSF from 1968 until 2002.

The existing riverfront property at the Site was formerly owned by the CM&SPR. The CM&SPR property was purchased by Mr. Brown in 1981, and the title is now held by SRP. The CM&SPR constructed a rail line circa 1911, which extended along the southern riverbank to a railroad tunnel which is located within the basalt embankment on the west side of the Site. The tunnel formerly connected the CM&SPR to the area known as the Milwaukee Trench, which parallels Trent Avenue east of Division Street. Historical records indicate that, during the construction of the CM&SPR, fill materials were deposited into the river, and the Spokane River shoreline was modified to its present configuration. Remnants of a former CM&SPR rail car turntable, consisting of an elevated concrete pad, are still present west of the James Keefe Bridge. The CM&SPR railroad tracks have been removed from the Site.

1.2.3 SITE INVESTIGATION BACKGROUND

Numerous environmental investigations were conducted between 1987 and 2000 by federal, state, and local regulatory agencies, and the Companies. Information indicated the presence of affected soil at the Site containing total petroleum hydrocarbons (TPH), polynuclear aromatic hydrocarbons (PAHs),

semivolatile organic compounds (SVOCs), volatile organic compounds (VOCs), metals, and cyanide above detection limits.

In 1999, The Companies and Ecology jointly agreed to negotiate an Agreed Order to complete a remedial investigation (RI) and feasibility study (FS). The RI and FS were completed in early 2001 and late 2000, respectively. Ecology issued the final cleanup action plan (FCAP) on August 10, 2001, and the Consent Decree No. 02205445-0 was recorded on September 12, 2002, which stipulated the terms for the cleanup action. The cleanup action is fully described in the *Engineering Design Report, Compliance Monitoring Plan, Health and Safety Plan,* and *Institutional Control Plan* published on May 28 and 29, 2003 (Landau Associates).

1.3 CLEANUP ACTION COMPONENTS

The cleanup action is described in Section 8 of the FCAP prepared by Ecology (Ecology 2001). Specific cleanup goals described in the FCAP include:

- Place a soil cap over the contaminated soil exposed on the ATC area to prevent direct contact with the materials.
- Decommission dry wells on the Site to reduce potential water infiltration and contaminant leaching.
- Grade the Site to direct surface water away from known areas of contamination to reduce infiltration and contaminant leaching.
- Utilize bioengineering along the Spokane River to stabilize the riverbank so that erosion or flooding does not cut back and expose contaminated soil, and provide additional vegetation along the shoreline to provide riparian corridor enhancement and water filtration.
- Implement institutional controls to prevent human contact with soil and groundwater media exceeding human health cleanup levels.
- Implement a compliance monitoring program to monitor performance of the cleanup action.

An irrigation system will be required to establish the vegetative cover along the Spokane River and will be the only active system to operate. All long-term aspects of the cleanup action will be passive. Therefore, this OMP is primarily focused on maintenance of the following passive components:

- Soil cap on the ATC property.
- Stormwater management system.
- Spokane River bank erosion control and vegetative cover.
- Groundwater monitoring facilities.

Other aspects of Site operation and maintenance are addressed in the *Institutional Control Plan* (Landau Associates 2003), restrictive covenants filed for the properties, and the *Compliance Monitoring Plan* (Landau Associates 2003).

2.0 REMEDIAL FACILITIES

This section describes remedial facilities that are planned for construction relative to the role of The Companies in providing long-term operation and maintenance of the facilities.

2.1 COMPONENT DESCRIPTIONS

The Site's cleanup action can generally be broken into three operation and maintenance areas, consisting of the BNSF property, the SRP property, and the Spokane River shoreline which is also owned by the SRP. The remedial action components that will require operation and/or maintenance in each of these three areas are described below.

2.1.1 BNSF (ATC) PROPERTY

Remedial action components on the BNSF property include:

- **Soil Cap:** A soil cap will be placed over the exposed contaminated soils to prevent direct contact. The cap area, shown on Figure 2 will be covered with a minimum of 2 feet of soil, plus additional material to bring the area to appropriate grades for stormwater drainage. The soil cover will consist of a base coarse and surfacing material. The base coarse material will be comprised of a naturally-occurring or recycled crushed sand and gravel mixture, and may include soils from the detention basin. The base coarse material will be compacted to at least 92 percent of its maximum dry density. A minimum of 6 inches of crushed surfacing material will be placed over the base material to promote surface water runoff and to serve as a running course for light traffic use. The crushed surfacing will be compacted to at least 95 percent of its maximum dry density.

- **Stormwater Management**: The final grade on the BNSF property will be sloped to direct runoff to a stormwater detention basin located at the east end of the BNSF property, away from the area of contamination.

- **Monitoring Wells:** Monitoring wells ATC07-20 and ATC07-40 are included in the compliance monitoring program and will remain on the property.

2.1.2 SRP PROPERTY

Remedial action components on the SRP property include:

- **Stormwater Management**: The ground surface overlying the contaminated area of the SRP property consists of compacted gravel and is relatively flat. Fill will be added to the SRP property to provide a drainage grade of approximately 0.5 to 0.75 percent away from the impacted area. Stormwater detention basins shall be constructed at the northeast and west central areas of the SRP property, outside of the contaminated soil boundary. Spoils generated from the detention basin excavations may be used for the first lift of fill material. Additional soil cover will consist of base coarse material compacted to at least 92 percent of its maximum dry density, with a minimum of 6 inches of crushed surfacing material

compacted to at least 95 percent of its maximum dry density. Two type A drywells will be installed in the northeast detention basin.

- **Monitoring Wells:** Monitoring wells installed at shallow, intermediate, and deep levels in the aquifer will remain at MW02, MW04, MW-07, MW08 and MW09 on the SRP property.

2.1.3 SHORELINE BIOENGINEERING

Bioengineering will be used to stabilize the riverbank so that erosion or flooding does not cut back and expose contaminated soil on the SRP property, and to provide additional vegetation along the shoreline to provide riparian corridor enhancement and water filtration. Restoration of the shoreline will be accomplished by constructing a riprap slope and planting selected willow, serviceberry, and several black cottonwood trees along the riverbank to the east and west of the Hamilton Street Bridge piers. An irrigation system will be installed on the shoreline rim and utilized until the plantings are established.

The limits of the restoration area span a total length of approximately 175 feet along the river, including approximately 45 and 65 feet of riverbank to the east and west of the bridge crossing, respectively. The vertical limits of the restoration area extend from below the normal pool elevation (approximate elevation 1,868 feet MSL) to the top of the existing bank at approximate elevation 1,884 feet MSL. The approximate location of the shoreline restoration is shown on Figure 3.

The components of the bioengineering are further described as follows:

- **Riprap Face:** Shoreline erosion beneath the Hamilton Street Bridge is due, in large part, to grading and filling activities associated with construction of the bridge piers in 1982. Riprap will be keyed into existing boulders and riprap, and placed over the eroded slope to protect the embankment from further erosion. The slope will be reconstructed using riprap comprised of angular basalt or granite stone, similar to those presently in place. The riprap gradation will be comprised of an approximately 2.3 ft median stone size, with a maximum size of approximately 3.4 feet. The interstitial voids of the riprap will be filled with topsoil to improve the substrate diversity on the higher reaches of the riverbank.

- **Transition Zone:** A transition zone will be constructed at the top of the bank to reduce the potential for erosion of the gravel layer which serves as the surfacing material for the upland portion of the Site. The transition zone will be comprised of a non-woven geotextile separation layer placed up against the riprap, and an adjacent well-graded sand/gravel/cobble zone to serve as a filter between the finer crushed surfacing and the large riprap material.

- **Vegetation:** Existing willow and black cottonwood saplings will be pruned back during construction, leaving their root systems intact. Vegetation in the riprap area will be augmented by driving live stakes of willow, black cottonwood, and serviceberry at a spacing of approximately 3 feet to 6 feet on center, where possible, between approximate elevation 1,874 feet and 1,884 feet MSL. Vegetation will not be planted beneath the bridge or within 20 feet of the bridge piers.

- **Irrigation:** An irrigation system will be installed at the top of the bank along the revegetated shoreline. The irrigation system will be used until the vegetation can survive naturally. It is

expected that the system will be used for a period of about 2 or 3 years, at which time it will be shut down and left in place.

3.0 OPERATION AND MAINTENANCE PROCEDURES

This section describes the requirements and procedures associated with the operation and maintenance of the remedial facilities to ensure their ongoing performance and maintain their intended design functions.

3.1 GENERAL MANAGEMENT

General management consists of personnel management, data management, and regulatory interaction as described below.

3.1.1 PERSONNEL

The Companies will operate and maintain the Site cleanup action during and following remedial construction activities, as agreed and described in the Consent Decree. The project coordinators for The Companies may be changed with written notice to Ecology at any time. The designated project coordinators for the Companies are:

Steve Schultz
Avista Corporation
411 E. Mission
Spokane, WA 99202
Phone: (509) 495-4008
E-mail: steve.schultz@avistacorp.com

Bruce Sheppard
The Burlington Northern and Santa Fe Railway Company
2454 Occidental Avenue, Suite 1A
Phone: (206) 625-5035
E-mail: bruce.sheppard@bnsf.com

The project coordinator:

- Has overall responsibility for Site Operation and Maintenance (O&M) activities.
- Has contractual authority for managing contractors and consultants.
- Oversees the services provided by consultants.
- Serves as primary contact for Site property owners and access issues.
- Coordinates O&M issues with property owners and regulatory agencies.
- Serves as primary contact with the regulatory agencies and schedules periodic status review meetings.
- Ensures that O&M record keeping and reporting are properly performed.
- Approves and submits required reports to Ecology.

3.1.2 REPORTING

Periodic inspection and maintenance activities will be performed for the various components of the cleanup action. The designated project coordinator will be responsible for the collection, documentation, and reporting of operation and maintenance data to Ecology. Operation and maintenance reports will be submitted annually to Ecology within 60 days of the scheduled operation and maintenance inspections.

3.1.3 MEETINGS

Meetings may be held with Ecology during the five year review period, or as required, to discuss the status of Site operation and maintenance activities and other issues, and will coincide with meetings regarding the status of the groundwater compliance monitoring. Meetings will be held on a schedule which will be agreed upon mutually between The Companies and Ecology.

3.2 OPERATION

An irrigation system will be installed to help establish the vegetative cover along the Spokane River where erosion control measures (riprap installation) disturb the existing vegetation. The irrigation system will be the only active system to operate, and will be operated until the vegetative cover can survive naturally. It is expected that the system will be operated for a period of about two or three years. The irrigation system will be operated as follows:

- System startup.
  - The irrigation system will be hydrated in the spring, after ground thaw.
  - At startup, the system will be adjusted to assure that all lines and sprinkler heads are operating as designed, and that water coverage is over the desired area.
  - Sprinkler heads or lines will be modified, repaired, or replaced as needed.
  - Batteries will be replaced in the timing controller and the timing function will be set.
  - The system will be checked the day of project startup and one week after startup to assure proper operation. Repairs or adjustments will be completed as necessary.
- System operation: The irrigation system will be checked monthly during the spring, summer, and fall operation period. Repairs or adjustments will be completed as necessary.
- System Shutdown: The irrigation system will be drained and winterized before the winter freeze. It is expected that the system will be winterized in October, depending on weather conditions.

Use of the irrigation system will be discontinued when the vegetation is growing vigorously and is capable of surviving on its own. System use will be scaled back with time and the vegetation will be inspected regularly to assure that plant die-off does not occur. Ecology will be notified in writing of the irrigation system shutdown a minimum of 10 days in advance.

All system startup and shutdown dates, observations, maintenance and repairs will be noted in the annual OMP Report

3.3 MAINTENANCE

3.3.1 SOIL CAP

The integrity of the soil cap on the ATC property will be maintained to avoid contaminated soil being exposed at the ground surface. Visual inspections of the soil covers will be conducted annually to document the condition of the cover and determine if any repairs are necessary to correct the effects of settlement, erosion, or other damage. It is anticipated that repairs would typically consist of placement and compaction of similar soil materials to restore the integrity of the soil cover.

In the event that excavations are made through the soil cover, all applicable requirements of the restrictive covenant and Institutional Control Plan will be implemented.

All observations, maintenance, and repairs will be noted in the annual OMP Report.

3.3.2 STORMWATER FACILITIES

Constructed stormwater facilities at the Site will consist of graded gravel surfaces sloped to three detention basins. Two type A drywells will be installed in the northeast SRP property detention basin. In the absence of any disturbances, the drainage components are expected to function as designed without active operation. The general approach to long-term maintenance of the stormwater management facilities will include:

- Conducting an annual Site inspection to identify any problems or areas of concern. Specific observation and documentation of conditions will include:
  - Disturbances caused by natural or human activities.
  - Surface soil conditions, noting potential areas of ponding, erosion, disturbances, and deviations from drainage design.
  - Detention basin conditions.
  - Dry well conditions.
- Evaluating each identified problem and, if required, identifying appropriate mitigation measures.
- Coordinating repairs or corrective actions.

- Reporting all observations, maintenance, and repairs in the annual OMP Report.

SRP has stated its intent to construct buildings and pave major portions of the stormwater management area on the SRP property. The engineering of the stormwater facilities has been designed to accommodate development based on preliminary development understanding; however, SRP will be responsible to design, permit, obtain Ecology approval, and modify the stormwater facilities to accommodate their final development plans. The Companies will relinquish stormwater facility management to SRP when modifications to the system or new facility construction is implemented. The Companies will continue the annual facility inspections to note conditions that might affect the remedial action design performance.

3.3.3 MONITORING WELLS

The integrity of each monitoring well included in the Compliance Monitoring Program will be evaluated during each groundwater monitoring event, or at least annually. Monitoring well inspection will include, but not be limited to:

- PVC casing observation for cracking, casing cap condition, staining that might indicate leakage into the casing, or any other conditions that might affect the groundwater monitoring quality objectives described in the Compliance Monitoring Plan.
- Steel protective casing observation for cracking, leakage, disturbance, and locking mechanism function.
- Concrete seal condition observation for settling, subsidence, erosion, or other damage.
- Protective bollard condition observation for settling, subsidence, or other damage.

Maintenance will include evaluation of each identified problem and, if required, identifying appropriate mitigation measures and coordination of repairs or corrective actions. All observations, maintenance, and repairs will be noted in the annual OMP Report.

3.3.4 BIOENGINEERING SYSTEM

The bioengineering system consists of a riprap face to control shoreline erosion, a transition zone between the riprap face and the graded gravel surface of the Site, vegetation on the riprap face, and a temporary irrigation system. Operation and maintenance of the irrigation system is described in Section 3.2. The following section describes the maintenance of the riprap, transition zone and vegetative cover.

At a minimum, annual inspections will be conducted of the bioengineering system to identify the need for any maintenance or repair activities. Items and conditions that will be noted during the bioengineering system inspections will include:

- Integrity of the riprap and transition zone materials (including the presence of undercutting and significant erosion or settlement).
- Stability of cut/fill slopes along the Spokane River bioengineered area.
- Condition of the vegetation (including vegetation stress, tree growth, and rodent intrusion).
- Presence of differential settlement and ponding of stormwater on top of or directly adjacent to the transition zone, and the condition of the surface drainage features.

Routine maintenance of surface vegetation, such as fertilizing and weed eradication, will also be conducted during the period of irrigation system operation. It is anticipated that The Companies will minimize or prevent the use of fertilizers and chemicals during long-term maintenance of the vegetative cover. However, The Companies may elect to use fertilizers during the early stages of growth and chemicals to minimize noxious weed intrusion.

If a significant problem with the shoreline erosion control measures is identified (such as major riprap undercutting or displacement), The Companies will make arrangements to evaluate and correct the problem(s), and will seek Ecology approval of major design or construction efforts.

General maintenance and repairs, such as replacement of plants, stabilizing eroding areas, filling depressions, and revegetating disturbed areas, will be noted in the annual OMP Report.

3.4 FUTURE CONSTRUCTION

It is possible that future construction or repair activities will be conducted on the Site. Because the location, nature and extent of such future construction or repair activities cannot be determined at this time, future construction activities by property owners, utility purveyors, or other users of the Site will be performed in accordance with a work plan acceptable to Ecology and The Companies as required by the restrictive covenants for the properties.

4.0 REPORTING AND RECORD KEEPING

This section provides an overview of record keeping and reporting requirements. Documentation and record keeping will be accomplished for the following items:

- Active system operation periods, and startup and shutdown procedures.
- Site inspections and maintenance or repair activities.
- Environmental regulatory compliance.
- Other information regarding related work at the Site.

4.1 REPORTING

An OMP Report will be submitted by The Companies to Ecology within 60 days of the annual inspection. The report may be in the form of a memorandum.

4.2 RECORDS HANDLING AND RETENTION

In accordance with the Consent Decree, all records must be maintained for a minimum of 10 years after the completion of all Site activities and termination of the Consent Decree. A copy of all records will be maintained or archived by The Companies.

5.0 EMERGENCY PROCEDURES

This section discusses emergency procedures related to long-term operation and maintenance of the soil cap, soil covers, and related stormwater facilities. For medical related emergencies, refer to the *Health and Safety Plan* (Landau Associates 2003). Dial 911 to contact the police, fire department, or ambulance service. Phone numbers for the designated project coordinator are provided in Section 3.1.1.

The following presents situations which are deemed to constitute an emergency regarding the soil cap, soil covers, and related stormwater facilities. Suggested response actions are also provided.

Emergency: Flooding.

Response: *The streambank erosion control riprap cover is designed to manage a 100-year flood event. The stormwater management facilities are designed to accommodate the first ½-inch of rainfall from a 10 year, 24-hour storm event, based on a paved surface, and therefore are significantly larger than needed to control stormwater from the unpaved gravel surface. The physical condition of the streambank erosion control and stormwater facilities should be inspected after major storm events to identify if there are any areas where erosion or debris may be adversely affecting the integrity or proper function of the facilities. Repair as necessary.*

Emergency: Landslide.

Response: *The streambank erosion control riprap cover is designed with a keyed footing and backing to provide resistance to mass movement. Any mass movement along the shoreline that could cut back into the contaminated soil shall be inspected and repaired immediately.*

Emergency: Fire.

Response: *Contact the City of Spokane Fire Department for fires. Check for any damage to Site vegetation after the fire is extinguished and repair as needed.*

Emergency: Earthquake.

Response: *An earthquake may result in damage to the shoreline erosion control features or side slopes of the detention basins. Damage to the soil cap or stormwater management facilities may not be immediately apparent; unusual conditions, such as seeps or soil boils, should be noted and evaluated. Check the Site for any signs of damage and repair as required.*

Emergency: Freezing

Response: *Freezing is not expected to significantly affect the shoreline erosion control, soil cap, or stormwater management facilities. Vegetation could be damaged in the event of rapid freeze or thawing cycles. Extended periods of freezing conditions could potentially cause some ice buildup adjacent to the bridge piers. Check the Site for any signs of damage and repair as required.*

6.0 REFERENCES

Ecology. 1996. *Model Toxics Control Act Cleanup Regulation, Chapter 173-340 Washington Administrative Code.* Washington State Department of Ecology. Publication No. 94-06. Amended February 12, 2001.

Ecology. 2001. *Final Cleanup Action Plan, Hamilton Street Bridge Site, Spokane Washington.* Washington State Department of Ecology. August 10.

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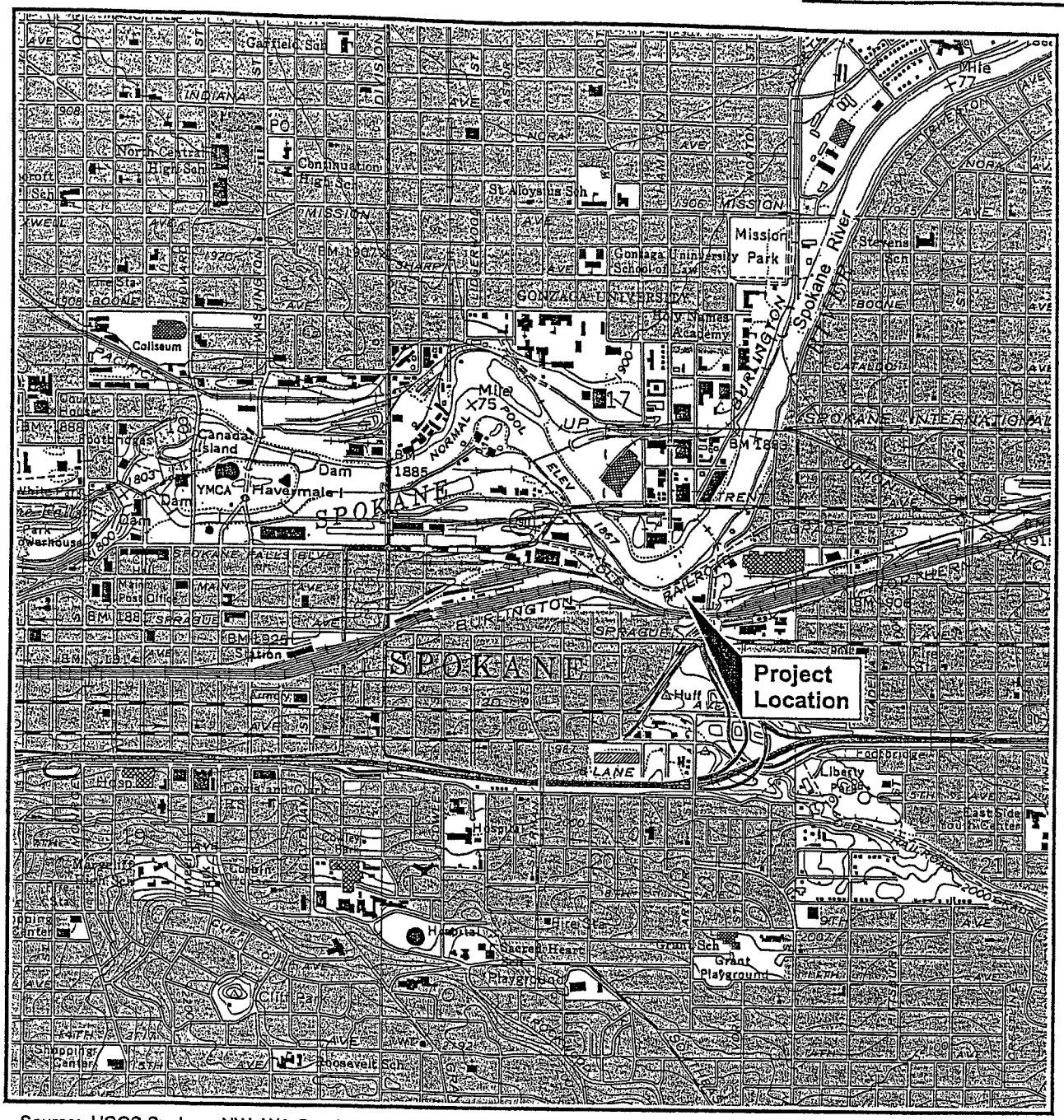
Landau Associates. 2003. *Institutional Control Plan, Hamilton Street Bridge Site, Spokane Washington.* Prepared for Avista Corporation and The Burlington Northern and Santa Fe Railway Company by Landau Associates, Inc., Spokane, WA. May 29.



Source: USGS Spokane NW, WA Quad, 1974: PR 1986

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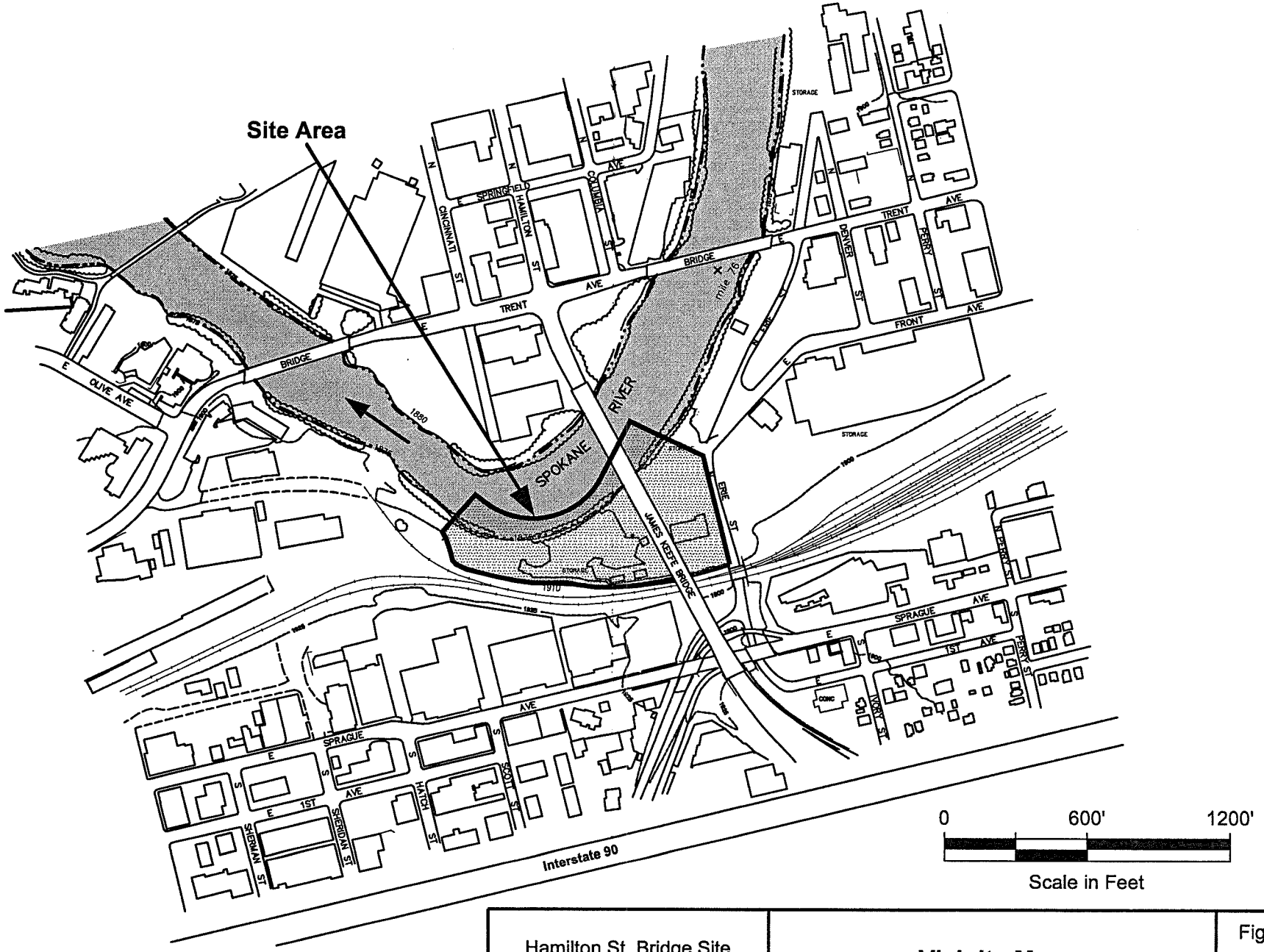
Hamilton St. Bridge Site Spokane, Washington	**Site Location Map**	Figure 1



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Hamilton St. Bridge Site Spokane, Washington	**Vicinity Map**	Figure 2

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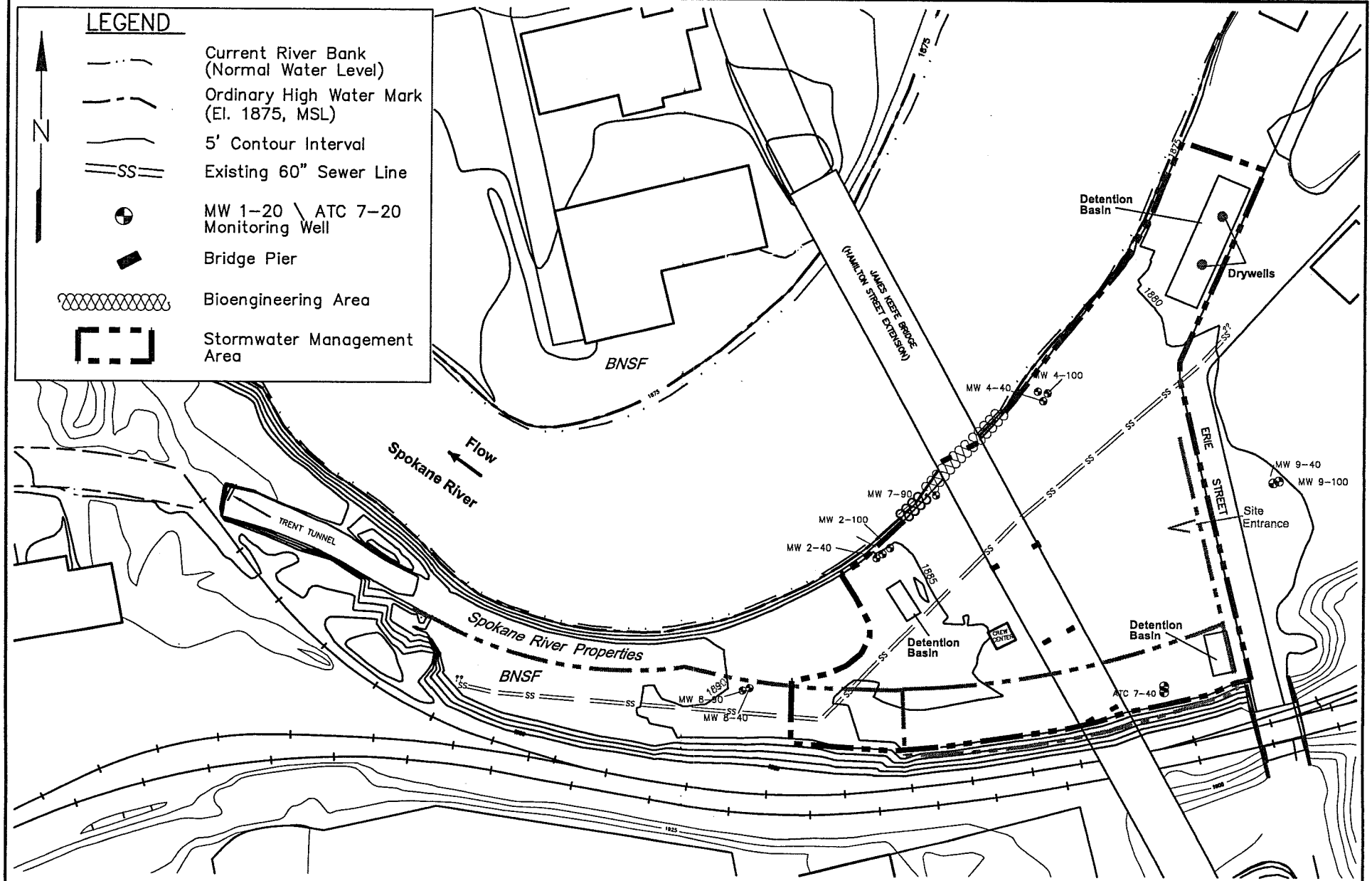

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0 200' 400'
Scale in Feet

Hamilton St. Bridge Site
Spokane, Washington

Operation and Maintenance Features

Figure 3