



June 15, 2015

Mr. Sam Adams, P.E.
Utilities Manager
City of Camas
616 NE Fourth Avenue
Camas, Washington 98642

SUBJECT: PROPOSAL FOR INFILTRATION AND INFLOW STUDY
CITY OF CAMAS, CLARK COUNTY, WASHINGTON
G&O #20152.65

Dear Mr. Adams:

Per your request, Gray & Osborne, Inc. is submitting this proposal for completing an Infiltration and Inflow Study. Completion of the study is required by Condition S4.E of the City's draft NPDES Permit.

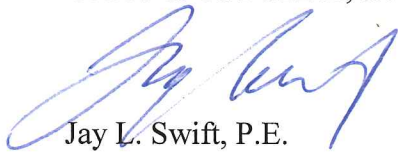
For this project, I would serve as the Principal-in-Charge. Ken Alexander from our Vancouver office would serve as the Project Manager. Greg Harem, Kyle Kirwan, and Abbey Trautman from our Vancouver office would serve as Project Engineers.

The proposed scope of work, including smoke testing, manhole inspection, flow monitoring, television inspection, infiltration and inflow evaluation, collection system recommendations, cost estimates, meetings, and preparation of reports, is provided in Exhibit A. As indicated in the attached Exhibit B, the estimated cost of the attached scope of work is the not-to-exceed amount of \$125,000.

Please let me know if you have any questions concerning this proposal.

Sincerely,

GRAY & OSBORNE, INC.



Jay L. Swift, P.E.

JLS/hhj
Encl.

cc: Mr. Steve Wall, P.E., Public Works Director, City of Camas

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CITY OF CAMAS – INFILTRATION AND INFLOW STUDY

Gray & Osborne, Inc. is hereby authorized to proceed with the engineering services as noted herein and under the terms and conditions of our current On-Call Water and Wastewater Engineering Services Contract dated December 2, 2013, for a cost not to exceed \$125,000 as noted herein without further written direction and authorization of the City.

Name (Print) *Scott Higgins*

Signature *Scott Higgins*

Title *Mayor*

Date *7-20-2015*

EXHIBIT A

SCOPE OF WORK

CITY OF CAMAS INFILTRATION AND INFLOW STUDY

This exhibit describes a scope of work for completing an infiltration and inflow (I/I) study of the City of Camas (City) wastewater collection system. This study is intended to address the following requirements in the City's draft NPDES permit:

S4.E. Infiltration and Inflow Evaluation

1. *The Permittee must conduct a study of inflow sources. The study must be submitted by May 15, 2016:*
 - *Quantify the level of inflow from each collection system basin or sub-basin in order to identify areas exceeding a peak day to monthly average peaking factor of 3.4:1 during the design rainfall event.*
 - *Determine the inflow related actions and projects necessary to reduce inflow in each identified sub-basin.*
 - *Describe policies and practices for removing inflow sources. Address both sewer customers and the public collection system. Include policies which consider where stormwater conveyance systems both are and aren't available and describe ordinance provisions necessary to effectively reduce inflow.*
 - *Estimate the cost for each major project.*
 - *Prioritize the list of projects to most cost effectively reduce the level of inflow to a peaking factor of 3.4:1 or less.*
 - *Propose a schedule for completing the inflow related actions and projects within the shortest feasible time frames.*
2. *Inflow Project List and Schedule. The Permittee shall implement the inflow strategy of its October 21, 2014, proposal. This includes completing initial and follow-up studies of inflow sources in years one and five of the permit, and accomplishing inflow*

specific projects commensurate with the funding levels proposed for years 2 - 4 of the permit.

Gray & Osborne's letter dated October 21, 2014, referenced in the draft NPDES permit stated that the City would conduct a comprehensive update to the *1998 I/I Study* in 2015 to 2016. The impacts of sewer system rehabilitation and other I/I reduction measures consistent with the *1998 I/I Study* will be evaluated and would include the following elements:

- Flow Monitoring
- Pump Station Run-Time Assessment
- Television Inspection
- Smoke Testing
- Physical Inspection

The I/I study will consider the return interval for past storms, antecedent groundwater conditions, and impact on flows. This will help determine if some of what appears to be inflow may actually be infiltration because of poor-draining soils.

The proposed scope of work is described below.

PROPOSED SCOPE OF WORK

Task 1 – Review Existing Data Collected by the City

- A. Review pump station run-time data (including for the months of August to December 2014 and additional data provided for 2015 by the time of this analysis) for 24 pump stations.
- B. Review video inspection records previously obtained by the City between 2007 and 2014 (see attached list of records received from City).
- C. Collect and review City wastewater treatment facility (WWTF) influent flow and rainfall records for the period 2011 to 2015.
- D. Collect and review City water consumption data for the period 2011 to 2015. Compare water consumption data to wastewater flows with adjustments for irrigation usage to estimate I/I.

Task 2 – Field Work to Collect Additional Data

- A. Measure and document 4 weeks of dry weather flows and 4 weeks of wet weather flows predominantly focused on gravity sewer lines in the older portions of the collection system. Assume City supplies one portable flow meter and Gray & Osborne leases eight others as needed. Compare to

wastewater treatment facility influent flow records and precipitation data for the same periods.

- B. Perform and document smoke testing for basins with gravity sewers (1, 2, 3s, 3n, 4, 5, 6, 7, 8, 9, and 10). Assume City supplies one person to assist with smoke testing.
- C. Perform and document inspections for up to 100 sewer manholes selected with the assistance of the City. Assume City supplies one person to assist with inspection.
- D. Conduct additional television inspection of prioritized sewers. (Maximum \$16,000 for subconsultant.) Review inspection video and summarize findings.

Task 3 – Meetings

Attend one project kickoff meeting, one meeting midway through the project and one meeting to discuss City's comments on draft report.

Task 4 – Prepare Infiltration and Inflow Report

- A. Summarize all previous efforts to identify and remove I/I, including the previous Gray & Osborne study (August 1998), manhole and pipe rehabilitation/replacement, and recent City data collection (pump station run-time data and video inspection).
- B. Evaluate and quantify I/I based on previous data collection work, WWTF flow records, and additional work performed for this study, including new television inspection videos, manhole inspection, flow monitoring data, run-time data analysis, and smoke testing.
- C. Provide prioritized recommendations, priorities, and cost estimates for inflow source correction, manhole and pipeline rehabilitation, and repair or replacement to remove I/I.
- D. Submit initial draft report with data analysis, conclusions, and initial recommendations for I/I removal as well as recommendations for City policies and practices to remove inflow as required by the draft NPDES permit.
- E. Review City comments and submit final report incorporating City comments.

- F. Review Ecology comments and submit final report incorporating City comments (maximum of one round of revisions to incorporate Ecology comments is included).

ASSUMPTIONS

1. The City will monitor pump station run time in 2015 and provide that data to Gray & Osborne. Gray & Osborne will identify key pump stations that should be monitored every day or every other day during peak storm periods (due to the requirement in the NPDES to identify *peak day to monthly average peaking factor of 3.4:1 during the design rainfall event.*)
2. The City will provide one field crew member to assist with smoke testing, manhole inspection, and flow meter insertion/removal.
3. It is assumed that it is not necessary to quantify flow in *every* sub-basin. In other words, it is assumed that I/I basins can be prioritized as likely containing higher I/I based on run-time data, television inspection data, and other observations, and those basins will be further evaluated with flow monitoring and the aforementioned prioritized pump station run-time monitoring.

EXHIBIT B

**ENGINEERING SERVICES
SCOPE AND ESTIMATED COST**

City of Camas - Infiltration and Inflow Study

Tasks	Principal Hours	Project Manager Hours	Civil Engineer Hours	Engineering Technician Hours
1 Review Existing Data from City				
A Review Pump Station Run-Time Data	2	4	8	
B Review Video and Photographic Inspection Records	2	2	16	40
C Review WWTF Influent Flow and Precipitation Records	2	4	8	
D Review Water Consumption Data		4	8	
2 Field Work to Collect Additional Data				
A Collection System Flow Measurement		16	20	80
B Smoke Testing (11 Basins)		8	88	88
C Manhole Inspections (up to 100)		4	64	24
D Television Inspection		4	16	16
3 Meetings	6	6	6	
4 Prepare I/I Report				
A Summarize Previous I/I Investigations and Removal Work	2	8	16	20
B Evaluate and Summarize I/I from Field Work	4	8	48	40
C Recommendations for Collection System Improvements	8	16	60	40
D Draft Report	8	16	60	32
E Final Report Incorporating City Comments	4	8	16	16
F Revisions to Incorporate Ecology Comments	4	8	16	16
Hour Estimate:	42	116	450	412
Fully Burdened Billing Rate Range:*	\$112 to \$182	\$115 to \$178	\$75 to \$118	\$45 to \$90
Estimated Fully Burdened Billing Rate:*	\$160	\$155	\$80	\$70
Fully Burdened Labor Cost:	\$6,720	\$17,980	\$36,000	\$28,840

Total Fully Burdened Labor Cost:	\$ 89,540
Direct Non-Salary Cost:	
Mileage & Expenses (Mileage @ current IRS rate)	\$ 1,400
Printing	\$ 460
Equipment Rental:	
Flow meters (8 each for two 4-week periods)	\$ 16,000
Subconsultant:	
Television Inspection	\$ 16,000
Subconsultant Overhead (10%)	\$ 1,600
TOTAL ESTIMATED COST:	\$ 125,000

* Actual labor cost will be based on each employee's actual rate. Estimated rates are for determining total estimated cost only. Fully burdened billing rates include direct salary cost, overhead, and profit.