



NapaSan

GHD - TASK ORDER No. 73
I/I Flow Monitoring (CIP #13705)

Date: _____

Issued under Professional Services Agreement dated August 9, 2017.

To: GHD

Project Description:

Professional Engineering Services

Description of Scope of Services to be performed by Consultant under this Task Order:

See Attachment 'A' – Scope of Services

Description of Services to be Provided by District: See Attachment 'A' – Scope of Services

Deliverables: See Attachment 'A' – Scope of Services

Consultant Project Manager: Matt Winkelman, PE

Consultant Quality Control Manager: Ted Whiton, PE

Schedule to Perform Services: See Attachment 'A' – Project Schedule

Time & Materials Not-to-Exceed Cost Limit: \$167,688

See Attachment 'B' – Project Fee
Estimating Sheet

APPROVALS:

GHD

By: _____
Authorized Representative Date

NAPA SANITATION DISTRICT

By: _____
Purchasing Agent Date

NSD Account No.: CIP 13705



ATTACHMENT "A"

October 30, 2019

2019-20 Inflow and Infiltration (I&I) Reduction Program

This scope of services is for wet weather assessment of NapaSan's sanitary sewer collection system during the 2019-20 wet weather season. Tasks include flow monitoring, nighttime infiltration and inflow (I&I) reconnaissance, consolidation of available I&I reconnaissance data from current and previous years, and preparation of corresponding reports that present the findings of the field work effort. The proposal is based on information received from NapaSan for the number of flow meters needed for assessment of pre- or post-construction assessment of I&I reduction efforts within NapaSan's collection system.

Project Understanding and Approach

Flow monitoring and nighttime reconnaissance is proposed to occur between December 2019 and March 2020, depending on weather conditions, and after early season rains have saturated the ground. GHD has subcontracted with V&A Consulting Engineers (V&A) for the flow monitoring and nighttime reconnaissance field work and reporting effort. V&A has completed flow monitoring and I&I analysis for NapaSan's collection system since 2005.

In consultation with V&A, NapaSan has selected 9 flow monitoring locations that focus on data collection for pre- or post-construction data for various I&I reduction efforts (i.e., rehabilitation projects such as pipe lining or bursting or manhole repairs). NapaSan has also selected targeted areas for nighttime reconnaissance that focus on identifying sources of I&I within the collection system.

Field Work

V&A will prepare for flow monitoring visiting the proposed flow monitoring sites and confirming preferred and alternative flow monitoring locations, as appropriate. Field work will include the installation, calibration, and removal of 9 flow meters and 3 rain gauges for a period of six weeks, with an option for extending the flow monitoring period in two-week increments at NapaSan's direction. Following the field work, V&A will evaluate the flow monitoring data and prepare a report. V&A will conduct nighttime reconnaissance in various locations within the collection system.

Reporting

V&A will prepare and submit a draft report to GHD for the flow monitoring and nighttime reconnaissance efforts. Preliminary flow monitoring results will be provided within four weeks after the flow meters are removed. GHD will review and provide comments to V&A for the reports. GHD and V&A will attend a review meeting after submittal of V&A's draft reports. The purpose of the meeting is to discuss the reports' results and findings. Final reports will be prepared following receipt of NapaSan's comments.

Basic Scope of Services

The professional engineering services for the Project are provided below.

Task 1 – Project Management and Coordination

GHD will coordinate with NapaSan during the project, including: budget and schedule tracking; project and contract oversight; and general coordination/communication. A formal kickoff meeting, work plan, and formal progress meetings are not included in this scope of services. Communication with NapaSan and V&A is intended to be informal and follow the need for coordination of wet weather field activities.

Deliverables: Monthly progress reports



ATTACHMENT "A"

Task 2 – Wet Weather Field Activities

Task 2.1 Flow Monitoring and Report

Project Preparation and Site Reconnaissance

V&A will review existing sanitary sewer plans and documentation in preparation for flow monitoring. V&A will visit the proposed sites in order to verify suitability of manholes and/or alternative manholes for installation of flow meters. V&A will consult with NapaSan in the event that alternative manholes are required for flow monitoring. V&A will document the following information: location map with address, pipe size, manhole identification number, flow channel condition, site schematics, and photographs. V&A will recommend the appropriate metering technology for the flow characteristics and hydraulic conditions observed during the site reconnaissance visits.

The site reconnaissance visit will document rain gauge placement areas, details and measures taken to eliminate undesirable influences of surrounding topography, vegetation, structures, etc.

Install/Calibrate/Remove Flow Meters and Rain Gauges

A V&A crew with a field truck and the necessary confined space, simple traffic control, and flow monitoring equipment will install, calibrate, and remove the flow meters and rain gauges. For this project, 9 flow meters and 3 rain gauges will be installed for a period of six weeks. The flow monitoring period may be extended in two-week increments at the direction of NapaSan (See Optional Tasks O.1 and O.2).

V&A will verify data integrity and that the meters are operational and clear of debris. V&A will be responsible for installation, calibration, and removal of the equipment for this project. Maintenance and meter malfunction will be documented and reported as soon as it is observed. V&A will be prepared to extend the duration of the flow monitoring period as requested by NapaSan.

This scope of services assumes only simple traffic control set-ups (truck mounted light board and cones) will be required for this project. If complex traffic control set-ups requiring a traffic control contractor are deemed necessary, the costs for the traffic control contractor will be in addition to the state costs for the flow monitoring. This scope of services also assumes that NapaSan or other jurisdictional permits (i.e., encroachment, traffic control plans, etc.) will be paid for by NapaSan. Costs incurred by V&A for permits will be in addition to the stated costs in Attachment "B". V&A will coordinate with the City of Napa as required for appropriate field work.

Flow Monitoring and I&I Analysis Study Final Report

V&A will download and reduce the data in 15-minute intervals into Excel spreadsheets for data analysis and report preparation. Preliminary flow monitoring results will be submitted within four weeks after the flow meters are removed. One Draft version and one Final version of the report will be prepared. The summary report will include the following information:

- A summary of the flow monitoring equipment used;
- Location maps with address, pipe size, manhole identifier number, flow channel condition, site schematics and photographs;
- Flow monitoring data with tabular outputs of depth, velocity and flow rate and hydrographs of depth, velocity and flow rates for each flow meter;
- Electronic copy of monitoring data provided in 15-minute time intervals; and
- I&I Analysis: Average dry weather flows curves will be determined and rain dependent infiltration and inflow (RDI&I) response will be isolated during wet weather rainfall events. I&I analysis will include developing synthetic I&I hydrographs for each flow monitoring site and applying the synthetic



ATTACHMENT "A"

hydrographs to a 10-year, 24-hour design storm. Pre and post-construction data will be compared to determine the effectiveness of NapaSan's I&I rehabilitation projects.

GHD will conduct a preliminary review the draft report and will provide the draft report with redline comments to NapaSan. The report with redline comments will be discussed at the review meeting (Task 2.3) and used for finalization of V&A's report.

Deliverables: Draft and Final Flow Monitoring and I&I Analysis Report – Three (3) hard copies and an electronic format (pdf) submittal

Task 2.2 Nighttime Field Reconnaissance

To better characterize the potential I&I sources in subareas within the collection system, V&A will conduct nighttime field reconnaissance within subareas with known or suspected high levels of I&I. A second benefit of the field reconnaissance is the potential of visual identification of I&I sources within the collection system.

Nighttime field reconnaissance will be conducted during low-flow hours, which is typically between the hours of 1:00 am and 4:30 am, when I&I flow is most evident ("clear-water" flow). This scope includes six (6) nighttime work shifts for field reconnaissance during the flow monitoring period. GHD and V&A will consider the location of prior nighttime field reconnaissance efforts and feedback from NapaSan prior to mobilizing for the work. Areas targeted for nighttime field reconnaissance include: Stonehouse, West F, West Pine, Downtown, and Adrian (NE quadrant).

Note: The effectiveness of the field reconnaissance is limited in what it may discover, such that the source of I&I may not be traceable from the field visits and the work may be dependent on investigations taking place during storm events, which are unpredictable. Evidence of I&I will be documented and, wherever possible, quantified. Depending on the characteristics and conditions unique to the basins being investigated, investigation measures may include general and/or detailed reconnaissance, and/or basin isolation by meter relocation or temporary meter usage.

GHD will conduct a preliminary review the I&I reconnaissance report and will provide the draft report with redline comments to NapaSan. The report with redline comments will be discussed at the review meeting (Task 2.3) and used for finalization of V&A's report.

Task 2.3 Review Meeting

GHD and V&A will attend a review meeting at NapaSan to discuss the draft reports and next steps for NapaSan's I&I Reduction Program.

Deliverables: Meeting agenda and notes

Task 3 – I&I Reconnaissance Data Consolidation

V&A will provide data for the various I&I reconnaissance efforts over the years into one data set, which will likely be based in GIS. GHD will present the compiled results and extents of previous years' I&I reconnaissance efforts within the space of an ESRI Story Map. This web-based format provides context and user interactivity to explore the spatial data and associated reports. The Story Map will entail a map with the spatial data provided by V&A with descriptive pop-ups when an area or feature is selected and controls to navigate around and into the data. A narrative will accompany the map with links to reports and other more detailed information, and can include graphs, summary data, photos, or videos. This format will provide both a clear overview and the ability to dive deeper into the background data depending on the interest of the user. ESRI Story Maps are developed within the ArcGIS Online environment and can be made publicly accessible or be conferred to NapaSan through its ArcGIS Online organization account, remaining private to the organization. Examples of Story Maps that



ATTACHMENT “A”

have been made publicly available can be found at this link (<https://www.esri.com/en-us/arcgis/products/arcgis-storymaps/stories>). Additional reference available upon request.

Deliverables: GIS Data, ESRI Story Map

Task 4 – I&I Reduction Program Assistance

This task includes miscellaneous tasks to support NapaSan’s I&I Reduction Program and other hydraulic analyses for the collection system. Tasks may include: hydraulic modeling; I&I analysis; consultation for field work not included in this task order (i.e., smoke testing, CCTV inspection); and other tasks as requested by NapaSan. Depending on the task scope, substantial effort to update the hydraulic model and conduct hydraulic analyses may be covered under a separate task order.

Deliverables: Variable depending on task

Optional Tasks

Task O.1 Additional 2 Weeks Flow Monitoring (6 weeks → 8 weeks)

At the direction of NapaSan, which would likely follow a review and discussion of weather conditions affecting the flow monitoring effort, the flow monitoring time period would be extended for an additional two weeks. The intent for extending the flow monitoring time period is to capture additional data from storm events. Analysis and reporting per Task 2.1 would also apply to this optional task.

Task O.2 Additional 2 Weeks Flow Monitoring (8 weeks → 10 weeks)

Similar to Task O.1, at the direction of NapaSan, which would likely follow a review and discussion of weather conditions affecting the flow monitoring effort, the flow monitoring time period would be extended for an additional two weeks. The intent for extending the flow monitoring time period is to capture additional data from storm events. Analysis and reporting per Task 2.1 would also apply to this optional task.

Project Schedule

Engineering services will commence upon issuance of the Notice to Proceed for this scope of services, which is anticipated to occur in November 2019. The Project will begin with project planning and site reconnaissance in December 2019. Timing for flow monitoring is weather-dependent, but anticipated to begin sometime between mid-December 2019 and January 2020. Flow monitoring will last for six to eight weeks. Nighttime I&I reconnaissance is anticipated to occur following storm event(s) during the flow monitoring period.

One month following the conclusion of the flow monitoring, V&A will submit its draft reports for deliverable to GHD. GHD will review the reports and provide the draft reports with redline comments to V&A and NapaSan within two weeks, at which time the project team will convene for the review meeting. V&A’s final reports will be submitted by V&A three weeks following the review meeting. The following provides an approximate schedule for the completion of the scope of services:

Table 1 Tentative Project Schedule

	<u>Task</u>	<u>Completion Date</u>
a.	Notice to Proceed	November 2019
b.	Project Planning and Site Reconnaissance (Task 2.1)	December 2019
c.	Conduct Flow Monitoring (Task 2.1)	December 2019 – February/March 2020 *
d.	Conduct Nighttime Field Reconnaissance (Task 2.2)	January/February 2020
e.	Prepare Draft Report (1 month) (Tasks 2.1 and 2.2)	March/April 2020 *



ATTACHMENT "A"

- f. GHD Review (2 weeks) (Tasks 2.1 and 2.2) April 2020 *
- g. Review Meeting (Task 2.3) May 2020 *
- * Timing depends on weather conditions and whether or not the flow monitoring period was extended from 6 weeks to 8 or 10 weeks.



ATTACHMENT "B"

PROJECT FEE ESTIMATING SHEET

Project Name: 2019-20 I&I Reduction Program

Prepared by: M. Winkelman

Job Number: 11199017

Client: Napa Sanitation District

Date: October 30, 2019

		LABOR COSTS						FEE COMPUTATION		
	LABOR CATEGORY > RATE >	Principal / QA/QC \$265 /Hr	Project Manager \$210 /Hr	Project Engineer \$185 /Hr	GIS Analyst \$140 /Hr	Admin \$155 /Hr	TOTAL HOURS	*OTHER DIRECT COSTS	Sub-Consultant V&A	TOTAL FEE
Task / Item										
Task 1 - Project Management and Coordination										
1.1 Coordination and Administration		1	8	1		2	12	\$72		\$2,512
Subtotal Task 1		1	8	1	0	2	12	\$72	\$0	\$2,512
Task 2 - Wet Weather Field Activities										
2.1 Flow Monitoring and Report		1	8	16			25	\$150	\$69,300	\$74,355
2.2 Nighttime Field Reconnaissance		1	8	8	8		17	\$102	\$45,675	\$49,202
2.3 Review Meeting		5	5				10	\$110		\$2,485
Subtotal Task 2		7	21	24	0	0	52	\$362	\$114,975	\$126,042
Task 3 - I&I Reconnaissance Data Consolidation										
3.1 I&I Data Consolidation		1	2	2	16		21	\$126	\$4,200	\$7,621
Subtotal Task 3		1	2	2	16	0	21	\$126	\$4,200	\$7,621
Task 4 - I&I Reduction Program Assistance										
4.1 I&I Reduction Program Assistance		2	16	40			58	\$348		\$11,638
Subtotal Task 4		2	16	40	0	0	58	\$348	\$0	\$11,638
PROJECT TOTALS		11	47	67	16	2	143	\$908	\$119,175	\$ 147,813
Optional Tasks										
O.1 Additional 2 Weeks Flow Monitoring (6 weeks --> 8 weeks)			1	1		1	3	\$18	\$9,450	\$10,018
O.2 Additional 2 Weeks Flow Monitoring (8 weeks --> 10 weeks)			1	1			2	\$12	\$9,450	\$9,857
Subtotal Optional Tasks		0	2	2	0	1	5	\$30	\$18,900	\$19,875
PROJECT TOTALS (With Optional Tasks)		11	49	69	16	3	148	\$ 938	\$ 138,075	\$ 167,688

*OTHER DIRECT COSTS include telephone, mileage, printing, photocopies and other miscellaneous direct expenses.