

Eastern Washington Stormwater Effectiveness Studies

Quality Assurance Project Plan (QAPP)

Business Education and Outreach Effectiveness Study

Study Classification:

- Structural BMP Operational BMP Education & Outreach

Study Objective(s):

- Evaluate Effectiveness Compare Effectiveness



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Prepared For:

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QAPP Publication Information

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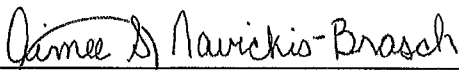
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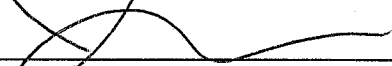
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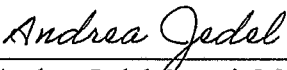
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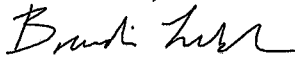
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2.0 Executive Summary

Under the National Pollutant Discharge Elimination System (NPDES) and State Waste Discharge General Permit for discharges from Municipal Separate Storm Sewer Systems (MS4s), municipalities and jurisdictions such as the City of Ellensburg are required by Washington State Department of Ecology (Ecology) in Eastern Washington (EWA) to manage discharges from their MS4s. The regulations of these jurisdictions are detailed by Ecology's Eastern Washington Phase II Municipal Stormwater Permit. The permit requires Permittees to evaluate the effectiveness of a permit-required stormwater management program (S8.A Monitoring and Assessment) and evaluate the effectiveness of an education and outreach program (S5.B.1.b). The study proposed in this document is designed to meet the requirements of both permit requirements.

The City of Ellensburg has chosen to cater their education and outreach (E&O) program to target restaurant management at fast-food businesses in the Ellensburg city limits. Restaurant management oversees staff who handle fats, oils, grease (F.O.G.), wash water management and disposal practices. The goal of this E&O program is for fast-food restaurant staff to adopt F.O.G. and wash water best management practices (BMPs) that protect stormwater, and to understand the impacts that F.O.G. and wash water pollutants may have on stormwater. In turn, the goal of this effectiveness study is to evaluate the effectiveness of the City's E&O program.

The desired BMPs to adopt were identified through a literature review of similar studies. The areas that these BMPs are located at fast-food restaurants include grease traps, grease interceptors, dumpsters, used oil containers, mop sinks, and from the employees themselves. Potential barriers for adopting behavior were also identified through the literature search.

The duration of this study is expected take place over the course of a few months. This study will be carried out by a City representative who will follow the guidelines described in this document. There will be two observational drive-by inspections and two in-person survey site visits. The first survey is just before the E&O materials are provided to assess baseline practices at the restaurant and the second survey is a few months after the E&O program is implemented (follow-up). The first site visits will include walking through the restaurant, specifically looking at where BMPs should take place, completion of a survey given to restaurant management to complete during the time of visit, recording observational data, and an educational lesson regarding F.O.G. and wash water impacts on stormwater. The materials which will be used for educational purposes has been prepared in the form of a flier. The flier will be presented at the time of the lesson and is intended to be posted for all staff at the restaurant to see. Both observational and survey data will be recorded on a prepared survey checklist. The observational and survey data gathered from the site visits will be compared to determine if there is a measurable change in the pre and post data.

The results from this study will be used by the City of Ellensburg staff to measure the effectiveness of and improve their E&O program strategies for F.O.G. and wash water management and disposal outreach to fast-food restaurants. Barriers identified in this study will be used to adjust the E&O program components. The effectiveness study can also be repeated for future use as the E&O program evolves.

3.0 Background

3.1 The Stormwater Education and Outreach (E&O) Program

This study will evaluate the effectiveness of an E&O program for the City of Ellensburg and measure adoption of targeted behaviors by the target audience. The stormwater pollutants of concern addressed by the E&O Program are cooking-related F.O.G. and wash water. F.O.G. and wash water are commonly created at restaurants and can create an illicit discharge if not disposed of properly. The E&O program will therefore focus on restaurants located within the city limits of Ellensburg, Washington, specifically fast-food establishments. The target audience of the study includes employees of the fast-food restaurants identified for this study.

Employees at fast-food restaurants are responsible for the maintenance and cleaning during their shift. This process can include maintenance of grease traps, grease interceptors, mopping, and disposal of waste materials, such as F.O.G. and wash water. Ideally, a restaurant employee would dispose of these materials according to BMPs. If the employee is unaware of proper disposal practices, these materials may find their way into the storm system via storm drains on the restaurant premises via direct dumping, improper dumpster maintenance, or by other means. The targeted behavior which the E&O program plans to address is proper maintenance and disposal of F.O.G and wash water.

An E&O program addressing F.O.G. and wash water was implemented in 2013 and is no longer active. The E&O program involved delivering a flier to local fast-food restaurants to inform restaurant personnel about the negative effects that improper F.O.G. and wash water disposal has on stormwater (see Appendix B). Due to high turn-around rates of employment in fast-food restaurants and the growth of the number of operating businesses within the City, an updated version of this program will be implemented and evaluated for this study.

3.2 Problem Description

The 2019-2024 Eastern Washington Phase II Municipal Stormwater Permit requires permittees to prohibit, through ordinances or other regulatory mechanism, non-stormwater discharges into the MS4 (Washington State Department of Ecology, 2019). Additionally, permittees are required to provide information to businesses, such as restaurants, regarding impacts and prevention of illicit discharges, proper management and disposal of waste, management of dumpsters and wash water, and the use of hazardous cleaning supplies and other materials. An E&O program targeting restaurants specifically was implemented in 2013 (see Section 3.1) and will be re-implemented to target fast-food restaurants on proper management and disposal of F.O.G. and wash water.

F.O.G. produced at restaurants can be introduced into the storm system by direct dumping, leaking or overflowing waste containers, or overflow from grease traps or interceptors (Husain, et al., 2014). Once the material reaches pipes, it tends to deposit onto the walls of the pipe. Over time, the deposits form partial or full blockages of the pipe, which then can cause localized flooding and damage nearby structures (O'Shields, 2019). F.O.G. can also create acidic conditions within the pipe, causing corrosion of metal pipes or dissolving concrete pipes (Fairfax County, n.d.). If F.O.G. continue downstream to a receiving water, the material can deplete dissolved oxygen content, suffocating aquatic life (Environmental Protection Agency, 2020). The material can also coat animals using the receiving water body as a habitat with oil, reducing their ability to obtain food

or maintain body temperature. According to the EPA, F.O.G. spills can have similar impacts on the aquatic environment as petroleum oils.

Wash water created during cleaning operations at restaurants can contain F.O.G., food scraps, and cleaning solutions. Regardless of whether the cleaning solutions are labeled non-toxic or biodegradable, the mixture of cleaning solutions and water can harm wildlife (Clean Water Services, 2016). Even when soap is not used, the F.O.G. and food scraps in wash water, along with other pollutants such as metals and dirt, can be harmful to aquatic organisms and wildlife if allowed to discharge to the storm system. As such, wash water is an important material to manage to limit F.O.G. and other pollutants from reaching stormwater infrastructure and receiving waters.

Re-implementation of the E&O program is needed to limit the impacts of F.O.G. and wash water in the Ellensburg stormwater system. Improper management and disposal of wash water and F.O.G. have been observed by staff during inspections or a drive-by. Barriers identified in the literature which could be reasons for improper disposal include cost associated with proper disposal, lack of incentives, and ease of disposal. Corporate policies of the fast-food restaurant chain may interfere with City codes, as identified by City personnel. Cost of proper disposal is primarily attributed to installing and maintaining grease traps and interceptors (Hamilton, 2003). Fast-food restaurant employees may be more likely to dump waste into manholes at the end of the shift, until incentives are provided (Tett, 2015). Recommendations by O'Shields, 2019 include locating F.O.G. disposal areas close to the kitchen and in well-lit areas, which implies ease of use may be a factor. This may also apply to wash water, as City of Ellensburg staff have reported observing remnant wash water, mop strings, and waste material at the back doors of restaurants leading into alleys. This suggests floors are being mopped after closing time, and water is being pushed into the alley, where water would enter the storm drain system instead of collected and disposed of in a floor drain or utility sink. Finally, from communication with some of the fast-food restaurants in Ellensburg, company policy requires the employees to power wash dumpsters occasionally to limit odors and pests. Based on observations of grease stains on pavement, City of Ellensburg staff believe wash water is being allowed to flow to storm drains instead of being collected and directed to the sanitary sewer. These barriers will be further investigated during the study, and recommendations will be provided at the end of the study to limit the impact of barriers on the targeted behavior.

3.3 Results of Prior Studies

3.3.1 Results of Prior Studies

Literature that identified restaurant managers' understanding of F.O.G. and wash water impacts on stormwater was not found during the literature search. In addition, information regarding the manager's knowledge of the importance to adopt BMPs related to F.O.G. & wash water pollutants was not identified. One study conducted by the Urban Stormwater Consortium (UWC) in North Carolina was identified that can relate behaviors and general public's understanding to the target audience the Ellensburg study is interested in.

The UWC study focused on resident's understanding of improper F.O.G. disposal impacts on Sanitary Sewer Overflows (SSO). The UWC survey primarily targeted Latino residents living in multifamily housing to address home-care practices pertaining to F.O.G disposal. The study revealed that the target population is not aware of the connection that at-home F.O.G. behaviors

negatively impact the overall sewer utility. Knowledge of SSOs was not recognized by study participants. It was commonly reported that participants believe that disposing a small amount of grease down the drain is environmentally acceptable, and if the pipes are clogged, running hot water and soap in the sink for a few minutes will resolve the problem. This out of sight, out of mind mentality has been noted as a barrier for the Ellensburg F.O.G. E&O Effectiveness Study. Similar to findings from a University of Wisconsin study, the UWC study results found that residents believe that wastewater facilities have treatment capabilities to filter grease from wastewater, which makes them think it is acceptable to dispose grease through the sink drain (Trechter, 2008).

The University of Wisconsin study was distributed once, therefore, adoption of behaviors was not measured. A few barriers that were identified and will be considered for the Ellensburg F.O.G. E&O Effectiveness Study included the following:

- Reaching the target population with outreach materials.
- Spanish language barrier.
- Lack of awareness or interest in the topic. However, it was found that women respond with concern to environmental impacts more than men, and men appreciate descriptions of the cost and practical damage caused. (Scott, 2013)

The Ellensburg F.O.G. E&O Effectiveness Study can be shaped from useful insight provided by this study. The behavioral insight of a population without knowledge of F.O.G. impacts on the environment can be considered similar for restaurant managers of fast-food businesses in Ellensburg. In both studies, the target population has a high turnover rate, being that residents of multifamily housing units are not permanently residing, and restaurant managers filter through often. F.O.G. disposal practices are discussed as a target behavior for both studies.

3.3.2 *BMPs Identified in the Literature*

Existing literature identified BMPs for proper management and disposal of F.O.G. and wash water. The BMPs are listed below, as well as a summary of literature associated with the BMP.

- **Employee F.O.G. training and behaviors:** The owner and restaurant management are responsible to train staff in BMPs and oversee the work of contractors hired to clean, remove and recycle F.O.G. (Clean Water Services, 2016). Employees are to be trained and educated on inspection processes and all other F.O.G. and wash water BMPs (Clean Water Services, 2016; O'Shields, 2019). Keep a log of employees who have been trained, along with details of when the training took place (Clean Water Services, 2016). Management is responsible for any clean-up charges as a result to any illicit discharges caused by employee behavior (Clean Water Services, 2016). When staff are trained properly, it is more likely that they will follow BMPs when they understand the potential environmental risk that could potentially result as consequences of their actions (Nipomo Community Services District Fats, Oils, and Grease Control Program, 2015). Employees should be trained on the process for reporting spills. A spill kit should be kept on the premises and employees should be trained on how to use it (Clean Water Services, 2016).

- **Grease trap maintenance:** A grease trap should be installed to aid in the containment of F.O.G. dispensing from kitchen sinks (Fairfax County, n.d.). Grease trap conditions must be checked regularly and replaced if they are leaky or defective (Luke, 2020). The F.O.G. levels inside the grease trap must be checked at least once per week (Fairfax County, n.d.), cleaning out at this time (Nipomo Community Services District Fats, Oils, and Grease Control Program, 2015; O'Shields, 2019), or before if levels rise to 25-33% full (Grease Cycle, 2019). To assure all employees have easy access to the grease trap, proper access and cleaning equipment shall be stored in the area for convenient use: i.e. a crowbar, rubber gloves, coveralls, shop vacuum, etc. (Grease Cycle, 2017).
- **Grease interceptor maintenance:** A grease interceptor must be installed to aid in the containment of F.O.G. dispensing from restaurant sewage utility systems (Fairfax County, n.d.; Clean Water Services, 2016). Train staff to open and close the grease interceptor to aid in inspections of F.O.G. levels (Clean Water Services, 2016). Visually inspect the grease interceptor residing area weekly for any evidence of surcharging (New Hampshire Legislature, 2007). Inspect these systems quarterly for any defects and for F.O.G. levels (City of Bellevue, 2009). If any defects are apparent upon inspection, immediate repairs are necessary (City of Apex, 2019). Schedule a contractor to clean the system every three months (Nipomo Community Services District Fats, Oils, and Grease Control Program, 2015; O'Shields, 2019), or sooner if floating F.O.G. levels raise to 25% (Fairfax County, n.d.). Clean grease interceptor sooner than three months, or 25% full, if there is an apparent foul odor (Grease Cycle, 2019). Keep a log of all grease interceptor inspection and maintenance tasks including the name of inspector, date of inspection or maintenance task, activity type, F.O.G. level percentage, any defects, and any action taken to fix defects (City of Bellevue, 2009; Nipomo Community Services District Fats, Oils, and Grease Control Program, 2015). When not in use, the manhole lids used to access the facility are left in a secured position (Occupational Safety and Health Administration, 2020).
- **Used cooking oil container maintenance:** Properly dispose of liquid and solidified F.O.G. waste in an on-site used cooking oil container rather than dumping elsewhere (Clean Water Services, 2016). The City of Ellensburg Code 9.25.310 and 9.25.320 prohibits any F.O.G. or food wastes from entering the storm system by any means. To aid in this prevention, the following BMPs shall preside. Place used oil containers away from storm drains and under a covered area where rainwater will not enter the containers (Nipomo Community Services District Fats, Oils, and Grease Control Program, 2015; City of Bellevue, 2009; New Hampshire Legislature, 2007). Keep lids to containers closed while not in use (Clean Water Services, 2016; Nipomo Community Services District Fats, Oils, and Grease Control Program, 2015; O'Shields, 2019). Replace containers if any leaks or defects are apparent (Clean Water Services, 2016; Fairfax County, n.d.; O'Shields, 2019). Inspect F.O.G. levels in container regularly and schedule for pick-up service before containers are completely full (Clean Water Services, 2016; Fairfax County, n.d.; O'Shields, 2019). F.O.G. waste produces foul smells, requiring frequent cleaning of storage areas to prevent odors (Clean Water Services, 2016; Grease Cycle, 2019).
- **Dumpster maintenance:** Most restaurants host a dumpster to dispose of solid waste in. Maintenance of these areas is required so that stormwater is not poorly impacted by any potential hazards these areas pose. The City of Ellensburg Code 9.25.310 prevents all non-environmentally friendly wash water from discharging to the City MS4. This includes

washing activities that contain chemicals and produce byproducts that are not environmentally friendly, such as pressure washing dumpsters. Municipal code overrules any conflicting corporate policies in place in restaurants within City limits (Bavis & Brammer, 2018). To ensure these codes are followed, the following BMPs shall be implemented. Locate dumpster containers under cover and away from storm drains where dumpster liquids are not able to run into the MS4 (City of Bellevue, 2009; Clean Water Services, 2016; Nipomo Community Services District Fats, Oils, and Grease Control Program, 2015; Snohomish Health District, n.d.) These areas should be kept cleaned and swept, and no trash left on the ground (Clean Water Services, 2016; Snohomish Health District, n.d.) . Dumpster lids are to be left closed while not in use (Clean Water Services, 2016). Containers should be kept in good condition, whereas no leaks or defects are apparent. Repair or replace containers if any defects are present (Clean Water Services, 2016; Snohomish Health District, n.d.).

- **Mop water disposal:** Disposing of wash water into the City MS4 is prohibited and considered an illicit discharge by the City of Ellensburg Code 9.25.310 and 3.25.320. Do not pour, sweep, or hose mop water and/or cleaning chemicals into storm drains (City of Bellevue, 2009; O'Shields, 2019). An approved area, such as a utility sink, should be designated for dumping mop water and for safe equipment washing including items such as kitchen mats, grills, mopping tools, or any other equipment (City of Bellevue, 2009; O'Shields, 2019). The path to the designated cleaning area, as well as the area itself, is to be kept clean and free of obstacles to aid in ease of use. Hazardous materials must be stored in an area that is protected from rain and in a way that prevents spills from reaching the storm drain (California Stormwater Quality Association, 2014). Chemicals should be stored in secondary containment, with no damage, as an extra form of precaution (Washington State Department of Ecology, n.d.).

3.4 *Regulatory Requirements*

This study is being conducted to meet the requirements of the 2019 Eastern Washington Phase II Municipal Stormwater Permit issued to the City of Ellensburg by the Washington State Department of Ecology. Section S8.A. of the permit requires Permittees to evaluate the effectiveness of their permit required stormwater management program activities or BMPs and recommended future actions based on the findings. The City of Ellensburg plans to evaluate an E&O program and serve as the sole entity during the study. The evaluation will also address section S5.B.1.b of the permit (Washington State Department of Ecology, 2019). According to the permit requirements in section S5.B.1.b, Permittees are required to measure the understanding and adoption of a targeted behavior for at least one target audience in at least one subject area. As such, results from this study will be used to direct E&O resources most effectively, as well as to evaluate changes in the adoption of targeted behaviors.

4.0 Project Overview

4.1 Study Goal

The goal of this study is to evaluate the effectiveness of the City's E&O program which educates fast-food restaurant management about proper disposal of F.O.G. and wash water. The study will specifically evaluate how effectively the program achieves the following:

- Education of business owners about the impact of their actions on receiving water quality
- Awareness of the proper disposal of F.O.G. and wash water
- Adoption of the E&O program's targeted behavior (i.e., properly disposing of F.O.G. and wash water)

The results of this study will be used to identify any barriers to adoption of targeted behaviors and recommend improvements for the fast-food restaurant E&O program. The improvements are expected to increase adoption of the targeted behavior and will help to direct E&O resources more effectively. This study is also being used to fulfill requirements S5.B.1.b and S8.A of the 2019-2024 EWA Phase II MS4 permit, as described in Section 3.4.

4.2 Study Description and Objectives:

This study will identify fast-food restaurants which could contribute to illicit discharges involving F.O.G. or wash water to the MS4. The test site will be any fast-food restaurants located in Ellensburg, Washington (excluding any restaurants located on the Central Washington University campus) and the target audience is fast-food restaurant staff (management and employees). The fast-food restaurants will be visited before and after the implementation of the E&O program to conduct site visits and drive-by inspections. Prior to the baseline site visit (first site visit), the lead entity (see Section 5.0) will perform an unannounced drive-by inspection, where they will visually inspect the condition of any used cooking oil containers and dumpsters on site. Following the drive-by inspection, the lead entity will visit the fast-food restaurants identified in-person. During the site visit, the lead entity will tour the restaurant with management and complete a survey as well as visually inspect the areas around the grease trap, grease interceptor, and mop or wash water disposal area to verify the responses during the site visit.

After the completion of the baseline survey, the lead entity will provide a flier containing information about the BMPs the restaurants should be implementing. By providing the educational information, the lead entity will be implementing an E&O program intended to increase adoption of targeted behaviors; specifically, to implement the BMPs related to F.O.G. and wash water. The restaurant management will be encouraged to place the flier in a location where other staff can see it, as well as pass on information learned during the site visit to all other staff. A few months after the first visit, a follow-up survey and drive-by will be performed following the same procedures as the first visit. To evaluate effectiveness of the E&O program, the survey from the first visit and the survey from the second visit will then be compared to determine whether there was any change in adoption of the targeted behavior, or more specifically, how effective the E&O program was in changing behavior.

The objectives of this study are:

- Understand whether fast-food restaurants currently implement BMPs for F.O.G. and wash water;
- Implement E&O program targeting adoption of BMPs for F.O.G. and wash water;
- Measure adoption of targeted behaviors at fast-food restaurants following education and outreach program; and
- Evaluate effectiveness of education and outreach program targeting fast-food restaurants.
- Identify barriers to adoption of targeted behaviors

4.3 *Study Location and/or Target Population*

Fast-food restaurants located within Ellensburg, Washington city limits will be the focus of this study (see Figure 4.3). These fast-food restaurants have been chosen as the focus due to their potential for discharging F.O.G. into the stormwater utility if not disposed of correctly. The defining characteristics of these establishments will be national or regional restaurant chains, as well as local stationary taco trucks, which are able to prepare meat and deep-fried foods quickly for take out or via drive through. The restaurants are generally located in the downtown area or are close to free-way ramps. Twenty fast-food restaurants in Ellensburg were identified for this study.

Fast-food restaurant staff (management and employees) have been identified as the target population for this study. More specifically, the employees responsible for BMPs involving F.O.G. and wash water. These BMPs include maintenance of grease traps, grease interceptors, dumpster areas, mopping, and disposal of waste materials, such as F.O.G. and wash water. These BMPs are responsibilities that most employees tend to during each shift. Restaurant managers are also a target for this study as they oversee the responsibilities of their employees who lead these maintenance duties. The targeted behavior for this study involves proper implementation of BMPs related to F.O.G. and wash water in order to help limit impacts on stormwater quality.

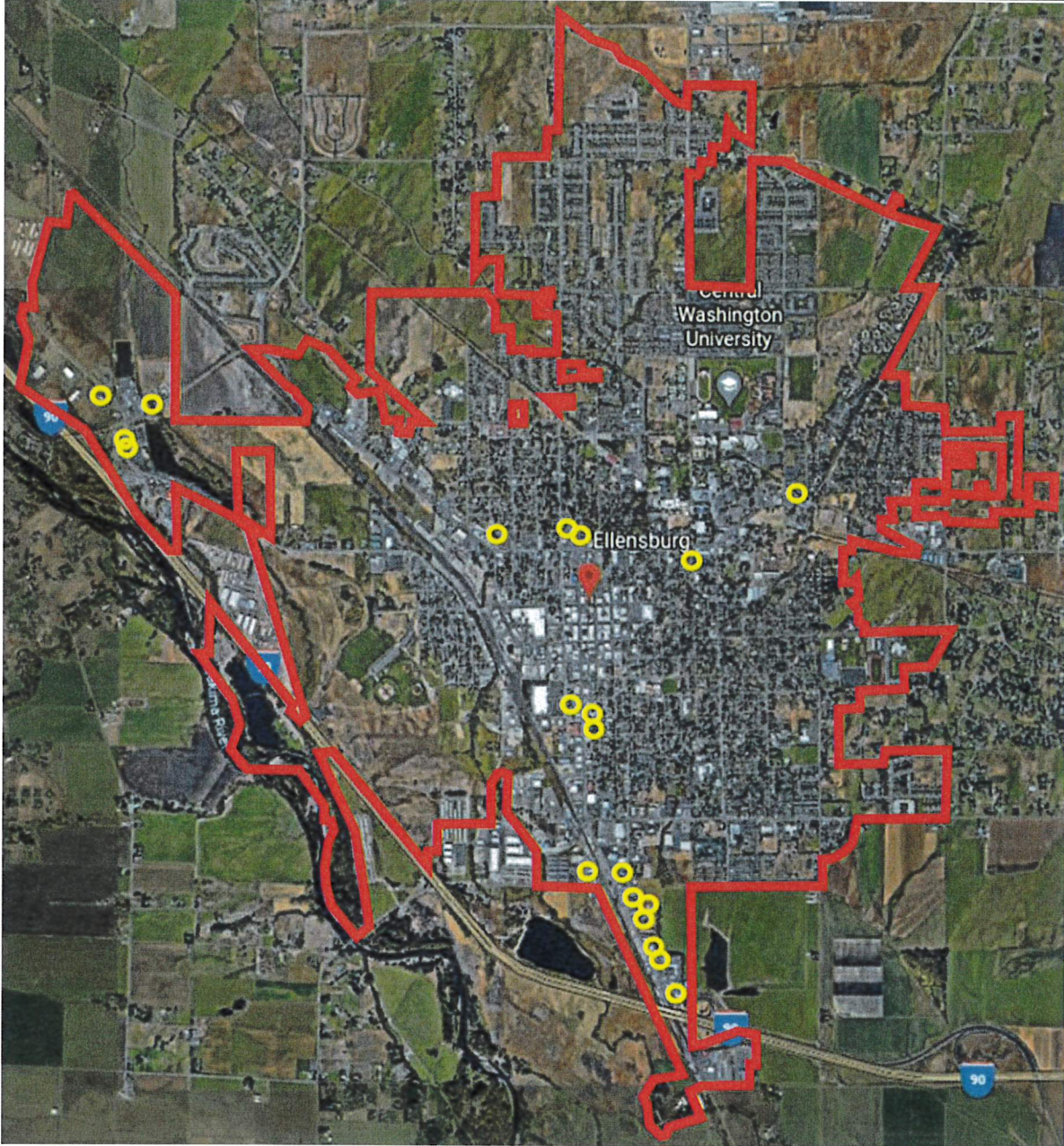


Figure 4.3 Locations of Fast-Food Restaurants in City of Ellensburg

4.4 Data Needed to Meet Objectives

The data listed in Table 4.4 is required to meet the objectives of the study.

Table 4.4 Data Needed to Meet Objectives

Data Type	How Data Will Be Collected	Purpose
List of Fast-Food Restaurants and Contact Information	Google Maps & Bing Maps cross referencing	Identifies target population of study; contact information will be used to schedule site visits
Baseline Drive-By Inspection Observations	In-person site visit; inspect BMPs outside of restaurant	Rule out social desirability bias (see Section 6.0). Observational data will be used to verify survey responses provided by fast-food restaurant management or staff.
Baseline Scheduled Site Visit Survey Responses & Observations	In-person site visit	Measure baseline adoption use of targeted behaviors before E&O program can influence behavior
Follow-Up Scheduled Site Visit Survey Responses & Observations	In-person site visit	Measure new adoption of targeted behaviors after E&O program has been implemented
Follow-Up Drive-By Inspection Observations	In-person site visit; inspect BMPs outside of restaurant	Rule out social desirability bias (see Section 6.0); help determine if behaviors have been adopted, ultimately proving the effectiveness of the study

4.5 Tasks Required to Conduct Study

Table 4.5 provides a summary of the tasks required to conduct the study and the corresponding project deliverables.

Table 4.5 Tasks Required to Conduct Study

Task Title and Description	Deliverables
1.0 Project Management <ul style="list-style-type: none"> Manage schedule and coordinate with research team and City of Ellensburg staff to complete tasks outlined for the study. 	<ul style="list-style-type: none"> Monthly Status Reports Agendas and notes for meetings with City of Ellensburg staff
2.0 Conduct Effectiveness Study <ul style="list-style-type: none"> <u>Identify Target Audience</u> – identify fast-food restaurants in Ellensburg. <u>Develop QAPP</u> 	<ul style="list-style-type: none"> List of Fast-Food Restaurants Draft & Final QAPP^{1,2}

Task Title and Description	Deliverables
<ul style="list-style-type: none"> • Ecology QAPP Review – coordinate review of QAPP and incorporate revisions. • Collect Baseline (Pre-E&O Implementation) Data <ul style="list-style-type: none"> • Baseline Inspection – use form in Appendix D to document areas outside restaurant where F.O.G and wash water practices take place • Baseline Scheduled Site Visit – conduct in-person site visit and complete survey (Appendix D). • <u>Deploy E&O Materials</u> – provide E&O materials to at the end of the baseline scheduled site visit about the impacts of F.O.G. and wash water on stormwater and proper F.O.G and wash water disposal procedures. • Collect Follow-Up (Post-E&O Implementation) Data <ul style="list-style-type: none"> ○ <u>Final Scheduled Site Visit</u> – return to fast-food restaurants and complete second copy of the survey (Appendix D). ○ <u>Final Drive-By Inspection</u> – Use form in Appendix D to document areas outside restaurant that F.O.G and wash water practices take place • Conduct Audit, Data Verification – audits and data verification will be performed during the study to ensure proper data collection, reporting, and analysis occur. • Evaluate Effectiveness - – analyze observational and survey data; compare pre and post data to measure adoption of targeted behaviors and assess change in understanding of proper disposal procedures. 	<ul style="list-style-type: none"> • Responses to Ecology Comments • Baseline Drive-By Inspection Survey Results • Baseline Scheduled Site Visit Survey Results • E&O Materials • Final Scheduled Site Visit Survey Results • Final Drive-By Inspection Survey Results • Data Analyzed/Summarized into Graphs and Tables • Annual Reports¹ • Study Fact Sheet¹ • Draft & Final Technical Report¹

Task Title and Description	Deliverables
<ul style="list-style-type: none"> • Technical Reporting – develop annual reports, study fact sheet, and a final technical report as defined in the QAPP Section 14.0. This will include analyzing and interpreting the data collected during the study as well as updating the E&O program to incorporate recommendations from the study. 	

¹ Submittals to Ecology.

² The QAPP submitted to Ecology meets the requirements of both the Detailed Study Design Proposal and QAPP for an Effectiveness study. As such, the QAPP will be submitted to Ecology as a Detailed Study Design Proposal and a QAPP.

4.6 Potential Constraints

Potential constraints are defined as conditions which may impact the project schedule, budget, and scope. Table 4.6 lists potential constraints as well as the actions to be taken to mitigate the impact of the conditions. Strategies for mitigating these constraints are discussed in Section 7.0 and are part of the study design and implementation.

Table 4.6 Potential Constraints

Potential Constraint	Mitigation Approach
Unable or unwilling to participate due to fear of enforcement action; potential for social desirability bias.	Communicate up front that survey and interview responses are being used to inform the development of a City E&O program and will not be used for enforcement action
Unable or unwilling to participate due to perceived inconvenience	Communicate that no preparation from establishments is necessary, and is preferred, for these site visits. Provide estimate of time needed to complete survey.
Unwillingness for staff to adopt the targeted behavior	Identify barriers during implementation of the E&O program, which will be used to improve future E&O program implementation.
Staff not involved in the site visits are unaware of BMP maintenance or best practices related to F.O.G. and wash water	All-staff meetings are encouraged to address the information given from educational materials provided by this study. Managers will also post the educational flier in a high-trafficked area by employees.
Conflicting guidelines between corporate policy and City code (City of Ellensburg, 2021)	Include in survey question about corporate policies to identify conflicts
Communicating information about impacts to stormwater and proper disposal procedures to entire staff	Communicate importance of disseminating E&O materials to entire staff or posting E&O materials in visible location.
Inconsistent responses provided on survey	Utilize carefully worded questions to guide survey responses. Survey will be validated before providing to target audience. Responses will be coded using a consistent process and verified.
COVID-19 restrictions limit ability to perform in-person site visits	Wear appropriate PPE during site visits and maintain social distancing.
Potential language barrier	Provide outreach materials in English and in Spanish.
Dumpster(s) &/or Used Cooking Oil Containers shared with other businesses	If a restaurant participating in this study shares a dumpster and/or used oil container(s) with another business not participating in the study, observational data for the restaurant will be flagged and analysis will be adjusted.

5.0 Organization and Schedule

5.1 Key Project Team Members: Roles and Responsibilities

Table 5.1 Key Project Team Members: Roles and Responsibilities

Key Team Members	Role	Contact Information
Jon Morrow City of Ellensburg	Lead Entity ¹ Project Manager ¹	morrowj@ci.ellensburg.wa.us (509) 925-8619
Andrea Jedel Department of Ecology	Ecology Reviewer ⁴	ajed461@ecy.wa.gov (509) 575-2807
Brandi Lubliner Department of Ecology	Ecology Reviewer ⁴	brandi.lubliner@ecy.wa.gov (360) 407-7140
Aimee Navickis-Brasch Osborn Consulting	Principal Investigator ²	aimeen@osbornconsulting.com (509) 867-3654 Ext. 301
Taylor Hoffman-Ballard Osborn Consulting	Researcher ³	taylorh@osbornconsulting.com (509) 867-3654 Ext. 302
MaKenna Lindberg Osborn Consulting	Researcher ³	makennal@osbornconsulting.com (425) 451-4009 Ext. 108
Mark Maurer Osborn Consulting	Document QC, Data Verifier ⁵ Auditor ⁶	markm@osbornconsulting.com (509) 867-3654

1. Lead Entity or Project Manager – Responsible for ensuring the study is conducted as described in this QAPP. The Project Manager is the primary point of contact for the lead entity.
2. Principal Investigator – Responsible for developing an Ecology approved Proposal and QAPP. Serves as the primary point of contact for the municipal project manager and Ecology. Responsible for conducting the study as defined in the Ecology approved QAPP. Responsible for submitting the study documents to Ecology including the Proposal, QAPP, and Final Technical Report. Responsible for management of all study documents, verifying and assessing the usability of data, and executing corrective actions. Responsible for developing the final report including data analysis, interpretation of results, and summarizing the study findings. Responsible for ensuring that staff working on this project are trained and have adequate experience to complete their assigned tasks.
3. Researcher - Responsible for assisting the Principal Investigator.
4. Ecology Reviewer – Responsible for reviewing and approving the study documents: the Proposal, QAPP, and Final Report.
5. Data Verifiers – Data verifiers will review the analyzed data and verify the analysis is correct and that the data being analyzed matches the data collected.
6. Auditor – Responsible for conducting audits to verify the study conforms to the plan and procedures of this document. This may include: verifying staff collecting the data are

trained and follow SOPs for data collection; verifying data management procedures are followed including reviewing data records to ensure they are consistent, correct and complete, with no errors or omissions; and traveling where the data is stored to review the data records compared to the QAPP Data Management Plan. Auditors will report their findings directly to the Lead Entity PM.

5.2 Project Schedule

A billable task timeline based on quarterly tasks is shown in Table 5.2.

Table 5.2 Proposed Study Timeline¹

Task and Deliverables	2021											
	Q1			Q2			Q3			Q4		
	J	F	M	A	M	J	J	A	S	O	N	D
Task 1. Project Management												
Project Schedule Maintenance												
Project Status Reports												
Client Check-In Meetings												
Task 2. Evaluate Program Effectiveness												
Identify Target Audience												
Develop Quality Assurance Project Plan												
Ecology Review												
Collect Baseline Data												
Conduct Audit												
Deploy E&O Materials												
Collect Follow-Up Data												
Conduct Data Verification												
Effectiveness Evaluation												
Annual Report ²												
Final Report (TER)												
Update E&O Program to include Study Recommendations												
Fact Sheet												

¹ In the event that an unforeseen delay occurs, a QAPP modification will be submitted and S5 requirements will take precedence over S8 to meet permit deadlines.

² Is submitted by permittee and not required to be a part of this study.

5.3 Budget and Funding Sources

The City of Ellensburg received funds from the Ecology Stormwater Capacity Grant. Ecology biennially hosts the Stormwater Capacity Grant for Phase I and Phase II Eastern and Western Washington NPDES municipalities. Projects eligible for this grant include activities or equipment necessary for permit implementation. The grant does not require any matched funding. This cycle's grant stops funding projects on March 31st, 2021. The City plans to use the remaining funds from this grant to partially fund this study. Any work completed after March will be funded by the City of Ellensburg's Stormwater Utility. A budget for the study is included in Table 5.3.

Table 5.3 Summary of Fees by Task

Task #	Task Name	Fees
1	Project Management	\$5,811
2	Conduct Effectiveness Study	\$44,187
Total		\$49,998

6.0 Quality Objectives

This section of the QAPP provides a roadmap of the quality assurance and quality control (QA/QC) plan that will be implemented in the experimental design and employed throughout the study.

The purpose of a QAPP is to ensure that the data collected during the study is scientifically and legally defensible (Washington State Department of Ecology, 2018). The QAPP documents how quality assurance (QA) and quality control (QC) will be applied to a research project to assure that the results obtained are of the type and quality needed and expected to support the intended outcomes of the study. The QA/QC plan for this study is embedded throughout the QAPP and emphasizes how the data quality indicators (DQIs) and respective measurement performance criteria (MPCs) are addressed during the study.

DQIs are qualitative and quantitative measures that characterize the aspects of quality data (EPA, 2006). DQIs are goals for data quality that are specific to each study. DQIs are intended to minimize error and improve the accuracy of the data. DQIs guide the development of the experimental design as well as the process of creating and analyzing data. The seven principle DQIs for this study are:

- Validity
- Reliability
- Objectivity
- Credibility
- Transferability
- Completeness
- Integrity.

Once established, the DQIs provide the basis for the MPCs which are the acceptance criteria for the DQIs that specifies how good the data must be to meet the project objectives. Table 6.1 first defines each DQI, then the approach for addressing DQIs and the respective MPCs for this study are described.

Reference Section 12.0 for details regarding the process that will be employed to evaluate the quality and usability of the data for meeting the project objectives which is based primarily on whether the MPCs were met for the applicable DQIs.

Table 6.1 Summary of the Seven Principle Data Quality Indicators (DQIs) for E&O Studies

Data Quality Indicator (DQI)	DQI's for this Study	Measurement Performance Criteria (MPCs) for this Study
<p>Validity - Closeness between the measured value and the true value. An instrument is considered valid when it measures what it is purported to measure (Biddix, 2016; Radhakrishna, 2012).</p>	<ul style="list-style-type: none"> The survey designed for this study was developed using literature regarding proper F.O.G. and wash water management and disposal practices (Section 3.3) Survey questions were written in concise language to be accessible to the target audience (i.e. restaurant managers or staff) Survey questions was pilot tested by Consultant staff to validate instruments before broad application (Section 8.3). 	<ul style="list-style-type: none"> Pilot testing the survey and observational data checklist will be used to validate the instruments (Section 8.3). The MPC for this DQI is that the group pilot testing mutually agrees on the interpretation of the survey and interview questions.
<p>Reliability - The degree to which an instrument produces stable and consistent results on repeated measurements (Radhakrishna, 2012). The level of precision or reliability, also called sampling error, is the range in which the true value of the population is estimated to be.</p>	<ul style="list-style-type: none"> SOPs are defined and will be consistently followed for collecting and measuring data (Section 8.2) Multiple instruments will be used to collect data: restaurant managers will be surveyed in-person, and observational data will be collected via a checklist to verify their survey responses. Survey questions were pilot tested by Consultant staff to validate instruments before broad application (Section 8.3) 	<ul style="list-style-type: none"> Audits will be used to verify procedures are being followed. Data will be considered acceptable if it is being collected in accordance with SOPs (Section 11.0). See description of pilot testing MPCs for validity. Responses from the surveys and observational data will be compared for consistency. The MPC for this DQI is that the responses are consistent; if the responses are not consistent, procedures are described in Section 13.1.
<p>Objectivity - Attempt to diminish or eliminate the investigators bias. (Clark, 1994) An objective investigator is neutral and open all sides of the argument without imposing their own bias, motivations, interested or</p>	<ul style="list-style-type: none"> Those performing the interviews will avoid the use of prompts and will ask a prepared list of questions to each participant being interviewed (Section 8.2) 	<ul style="list-style-type: none"> The survey and observational data SOPs will be followed for all participants. Peer debriefing will be used to validate coding and the group will mutually agree on

<p>perspectives (Guba, 1981; Radhakrishna, 2012).</p>	<ul style="list-style-type: none"> • Data analysis procedures and methods are used that are appropriate for the types of data collected (Section 13.0) • Data coding and hypothesis testing will be used to provide evidence that conclusions are based on findings • SOPs are defined and will be consistently followed during the survey and observational data collection (Section 8.2) 	<p>the interpretation of the coding (Section 13.0).</p> <ul style="list-style-type: none"> • Hypothesis testing will be used to compare baseline and follow-up (pre- and post-E&O program implementation) data at a defined confidence interval and statistical power (Section 13)
<p>Completeness - The amount of valid data needed to be obtained from the measurement system (Lombard & Kirchner, 2004). Data is considered complete when: the sample size is representative of the target population.</p>	<ul style="list-style-type: none"> • The sample size is equivalent to the number of fast-food restaurants in the City of Ellensburg located outside of the Central Washington University campus, as the population of fast-food restaurants in Ellensburg is limited. • Procedures for handling missing data are defined in Section 10.3. • Results will include consideration for how missing data could limit transferability of data set 	<ul style="list-style-type: none"> • The sample population will be contacted multiple times (Section 8.0) to in an attempt to ensure site visits are scheduled and to increase the number of restaurants which participate in the study; procedures for non-responses are included in Section 8.2. • Missing data will be reported with appropriate coding
<p>Credibility – Credibility is often referred to as social desirability bias. This describes a type of response bias where survey respondents answer questions in a manner they believe will be viewed favorably by others. It can take the form of over-reporting "good behavior" or under-reporting "bad" or undesirable behavior (Grimm, 2010).</p>	<ul style="list-style-type: none"> • Careful consideration was taken regarding social desirability bias in how survey questions were worded. Also, the survey will be introduced in a way to communicate the responses will be used to develop an E&O program and not for enforcement (Section 8.2). • Multiple types of instruments will be used to collect and cross check survey responses. Specifically, observational data collected 	<ul style="list-style-type: none"> • Responses from the survey and observational data will be compared for consistency. The MPC for this DQI is that the responses are consistent; if the responses are not consistent, procedures are described in Section 13.1. Mixed methods will be used to collect data including the survey and observational data. The MPCs with respect to this DQI are as described in the previous bullet.

	<p>will be used to check survey responses provided by restaurant staff (Section 13.1)</p> <ul style="list-style-type: none"> Participants will be informed prior to the in-person visit as well as immediately before giving the survey that their responses will be used to develop an E&O program and not enforcement (Section 8.2). 	
<p>Transferability – The extent to which sample data can be transferred from a sample to a population. Datasets are considered transferable if the instruments, data sources, data collection procedures, sample selection procedures, and reporting are equivalent (Washington State Department of Ecology, 2011)</p>	<ul style="list-style-type: none"> Fast-food restaurants defined as national or regional restaurant chains, as well as local taco trucks, which are able to prepare meat and deep-fried foods quickly for take out or via drive through, were identified as the target audience. the study area is within the City limits. Due to the limited study area and number of fast-food restaurants in the study area, the population and sample size are the same. Follow-up procedures according to SOPs in Section 8.2 will be used for non-respondents. 	<ul style="list-style-type: none"> Data will be considered transferable if the participants or target audience being assessed consists of fast-food restaurants as defined in the approach for addressing this DQI.
<p>Integrity - Integrity is concerned with minimizing errors through the process of collecting, recording, and analyzing data (Radhakrishna, 2012).</p>	<ul style="list-style-type: none"> SOPs will be consistently followed during data collection (Section 8.2) Data recording and reporting procedures were developed (Section 10.2 and 8.2). The survey and observational data checklist is a standard form which will be used to collect all data. Data will also be reviewed to ensure it has been properly recorded. Those involved in data collection will be properly trained to follow the SOPs. Responses to survey questions and observational data will be compared for the 	<ul style="list-style-type: none"> Audits will be used to verify that procedures are being followed. Data will be considered acceptable if it is being collected in accordance with SOPs (Section 11.0) All those involved in data collection will collect data according to the SOPs and be trained prior to data collection. If the survey and checklist responses are found to be similar, it will be assumed that the restaurant staff's survey responses accurately reflect the implementation of

proper F.O.G. and wash water management and disposal practices at the restaurant.

same restaurant to determine if they are consistent.

7.0 Experimental Design

7.1 Study Design

This study will assess the City's F.O.G and wash water E&O program by utilizing surveys provided during two site visits as well as observational data at fast-food restaurants. The surveys will gather information regarding F.O.G. and wash water management and disposal practices, and barriers to adoption of those practices. The results of the in-person surveys will inform the implementation of the F.O.G and wash water E&O program by the City. The observational data will be conducted during the site visits and in the form of two drive-by inspections. The observational data will be used to assess the accuracy of the survey data. The following paragraphs provide an overview of the study design, specifically, the E&O program and target population, instruments used to collect data collection, the approach to evaluating effectiveness and measuring adoption of behaviors, and justification for selecting the approaches noted. The subsequent sections (Sections 7.2-7.5) provide more details regarding the study design.

The target population for this study is fast-food restaurant employees. Reasoning for the selection of the target population is provided in Section 7.2 and a list of fast-food restaurants will be included in data collected for the study (see Section 7.3, Appendix A). The E&O program being implemented by the City for this study is meant to provide information to fast-food restaurant employees regarding the impacts of F.O.G. and wash water on stormwater and proper F.O.G. and wash water management and disposal practices. The E&O program consists of an in-person visit by City staff to fast-food restaurants to provide a flier containing information on impacts of and proper F.O.G. and wash water management and disposal practices (Appendix C). The proper management and disposal of F.O.G. and wash water is the targeted behavior for the E&O program. As the flier is provided in-person, the fast-food restaurant management will be able to ask questions or request clarification when the information is provided. This study intends to measure the effectiveness of the E&O program, and the following paragraphs detail how data collection will occur during the implementation of the E&O program.

At the start of the study, the lead entity will contact restaurant management from the twenty fast-food restaurant locations identified for the study as described in Section 8.2.2 to schedule an in-person site visit. The visit shall be scheduled for a date that management is present and for a time outside of lunch or dinner hours. While scheduling the visit, management will be informed that that the visit is intended to aid in the development of a City E&O program. The lead entity will stress that enforcement will not be implemented for any malpractice observed and that staff will be available to provide information to participants and answer any questions they have. The lead entity will also inform management that a second visit will be conducted, which will also be a non-enforcement, informative visit for the purpose of developing the E&O program.

Before conducting the baseline site visit, the lead entity will conduct an unannounced drive-by inspection of survey items located outside of the fast-food restaurant as described in Section 8.2.1. No restaurant management will need to be present for these visits. The inspection will focus on the dumpster(s) and used cooking oil container(s) on-site, and whether BMPs for proper management and disposal of F.O.G. and wash water are being implemented in those areas. The lead entity will record observations in the associated section of the survey for observational data. The remaining prompts in the observational data will be completed during the baseline site visit.

The baseline site visit will be conducted according to the SOPs in Section 8.2.2 involving introductions to restaurant management and use of a survey to determine the level to which employees implement proper management and disposal practices of F.O.G. and wash water (Appendix D). The lead entity will visit these locations prepared with the appropriate COVID-19 personal protective equipment (PPE) for each site visit. At this point, the restaurant management will be reminded that this visit is intended to aid in the development of a City E&O program, and not as an enforcement visit. Following introductions, the lead entity should request an opening and closing checklist of employee maintenance duties at this point if available. This checklist will act as another form of data verification to compare with the target behavior BMPs. Next, the lead entity and management will tour areas of the restaurant where F.O.G. and wash water are handled, while completing the survey. The survey will serve as the instrument for collecting verbal survey responses and observational data during the study. The survey focuses on several BMPs related to F.O.G. and wash water management and disposal practices, including:

- Grease trap maintenance
- Grease interceptor maintenance
- Used cooking oil container maintenance
- Dumpster maintenance
- Mop water disposal
- Employee F.O.G. training and behaviors

The BMPs on the survey were identified in literature specific to F.O.G. and wash water management and disposal practices (see Section 3.3). Each section on the survey includes questions related to one of the BMPs. During the tour, the lead entity will ask the questions as they are worded and record the response of management on the survey. The lead entity will visually inspect the grease trap, grease interceptor, mop water disposal, and employee training records (if available) or behaviors to verify the information communicated by management. The results of the visual inspections will be recorded in a section of the survey specifically for observational data. Each section of the survey will also include a table to note any barriers that would potentially restrict proper implementation of the specific BMP. The barriers will be discussed only after all questions in that section of the survey have been answered by management. The final page of the survey has spaces to record the food establishment name, address, management's name(s) who are present, contact information, inspector name, and date of inspection. This information will be used to schedule a follow-up site visit.

Following the tour of the restaurant, the lead entity will provide an educational flier and explain the material detailed on the educational flier (Appendix C). The lead entity will also provide the flier via email. The lead entity will answer any questions regarding the flier from the management at this point of the visit. The lead entity will request that the educational flier be posted by the restaurant management in a place for all of the restaurant staff to read, and if possible, that management discuss information provided during a meeting with remaining staff. Also, management will be reminded that a second, non-enforcement visit will be scheduled.

The second site visit will be scheduled at least a month after the baseline visit, with the same restaurant management that took part in the first visit, if available, with the lead entity. The second

site visit will be conducted according to the SOPs in Section 8.2.4. At start of this visit, remind restaurant management that the visit will be used to aid in the development of a City E&O program and that the lead entity will not seek out enforcement during the visit. Following re-introductions, a copy of the opening and closing checklist of employee maintenance duties should be obtained if the duties have changed since the baseline site visit and if available. The survey will then be filled out for a second time while touring the restaurant. The responses provided by management will be recorded on the survey, as well as the results of visual inspection, and the contact information of restaurant management. After each section of the survey is completed, barriers which limit staff from implementing BMPs will be discussed. Any remaining barriers identified during the second site visit will be addressed and summarized in the recommendations of the final report.

Within a week of the second site visit, a second unannounced drive-by inspection will be performed according to the SOPs in Section 8.2.3 by the lead entity to verify whether BMPs for dumpsters and used cooking oil containers are being implemented. The lead entity will record observations in the section of the survey specifically for observational data. The data will be used to supplement the data collected during the second site visit and to verify the information provided by management during the site visit.

Following data collection, the effectiveness of the E&O program and adoption of targeted behaviors will be evaluated. The results of each site visit and associated survey and observational data will be compiled and compared to determine whether there is a change in the targeted behaviors following implementation of the E&O program. As mentioned previously, the first survey and observational data will provide an estimate of existing implementation of targeted behaviors. The survey and observational data from the first site visit and drive-by inspection will be coded separately and grouped into categories which will be associated with a Likert Scale, specifically "adoption of BMP", "partial adoption of BMP", or "no adoption of BMP". At this point, the survey data and observational data categories for an individual restaurant will be compared to determine whether they match. If survey data and observational data do not match for a particular BMP, the survey data will be flagged to qualify that there was a discrepancy between the verbal survey response and observed condition of the BMP. Following comparison of the observational and survey data, the Likert Scale will be used to convert qualitative data to quantitative data, and the number of BMPs currently in use for each restaurant will be summed. The process described in this paragraph will be repeated for the survey and observational data created during the second site visit and drive-by inspection.

Once the data from both site visits and drive-by inspections has been coded and compiled, the data will be compared to determine the difference between the site visits. If the data recorded indicates a statistically significant increase in adoption of BMPs, or more specifically targeted behaviors, has occurred, the program will be considered effective. If the data recorded indicates that no significant change occurred, then the E&O program will be considered not effective, and removal of barriers to implementing targeted behaviors will need to be revisited. The evaluation of effectiveness is described in further detail in Section 13.0.

7.2 Process for Selecting the Test-Site and Target Population

The test site for the study consists of fast-food restaurants located in the city limits of Ellensburg, Washington. Fast-food restaurants were defined as national or regional restaurant chains, as well as locally owned taco trucks, which are able to prepare meat and deep-fried foods quickly for take

out or via drive through. These businesses were selected based on their potential for releasing F.O.G. and wash water into the stormwater utility as an illicit discharge. Additionally, the City has previously implemented an E&O program for this target audience in 2013. Due to anticipated employment turnover in the fast-food restaurant industry and increase of the number of businesses since the last implementation, the City determined this to be an applicable target audience for this behavior change study. The target population consists of fast-food restaurant staff (management and employees). The following paragraphs describe how the test site and target population were selected.

A list of all restaurants located in the City of Ellensburg was compiled using Map data ©2021 Google Maps and ©2021 Bing Maps and can be found in Appendix A. Details such as address, phone number, and company websites were noted for 133 restaurants. The restaurants identified were then investigated to determine whether they met the definition of fast-food restaurants. Additionally, company websites, customer review dates, and discussions with Ellensburg officials determined whether the fast-food restaurants were still in business. Businesses which had closed temporarily or permanently were not included in the test site for this study. Any restaurants located on the Central Washington University (CWU) campus were also not included due to the university's status as a secondary permittee. The original list of Ellensburg restaurants was reduced to 20 fast-food restaurants: 11 drive-thru restaurants, 4 food trucks, 2 pizza restaurants, 1 sit-down restaurant, and 2 fast food restaurants attached to gas stations. The F.O.G. and wash water management and disposal practices of employees at these 20 restaurants will be the focus of this study.

Employees of fast-food restaurants are responsible for maintenance of grease traps, grease interceptors, mopping, and disposal of waste materials, such as F.O.G and wash water. Their actions have a direct impact on F.O.G and wash water, and their behaviors determine whether BMPs are maintained and materials are disposed of properly, or whether it reaches the storm drain system. The employees of the fast-food restaurants identified for the study are therefore the target audience of this study. The restaurant manager or other knowledgeable staff will be surveyed as part of this study, as they are knowledgeable of their employees opening and closing maintenance duties and behaviors.

To account for potential restaurant staff turnover during the study, surveys will be taken a few months apart and questions will be added to the follow-up survey to address the issue. Because the surveys will only be taken a few months apart, it is expected that low staff turnover will occur during this period. Questions regarding what percentage of staff have turned over since the baseline survey site visit as well as confirming whether the person being surveyed worked at the restaurant during the baseline survey visit will provide an indication of any staff turnover which did occur between visits. If staff turnover is high for the average participating fast-food restaurant during the study, staff turnover will be listed as a barrier and recommendations for the E&O program will be included in the final report.

7.3 Type of Data being Collected

The data required to meet the objectives of this study are described in Table 7.3.

Table 7.3: Summary of data being collected

Data Type	Purpose
List of Participants (fast-food restaurants and staff)	This study will develop a list of all fast-food restaurants identified for the study including staff contact information.
Survey Responses from Participants	Survey responses will be provided verbally and used to gather information regarding F.O.G. and wash water management and disposal practices at fast-food restaurant locations. Verbal responses from restaurant management will provide the lead entity with information that is not possible to know without insider knowledge. Verbal responses will be compared against observational data for any differences in apparent practices that may be used. This information will be analyzed with observational data to evaluate and compare the effectiveness of the E&O program. Lastly, the information will be used to identify barriers prohibiting adoption of maintenance and structural BMPs.
Observations from Site Visit(s) and Drive-By Inspection(s)	The purpose of general observations is to validate the findings from the survey. General observations will be used to compare any differences between restaurant management responses and apparent practices that may be used. This information will be analyzed with survey responses to evaluate and compare the effectiveness of the E&O program.

7.4 Implementation of E&O Program Component During the Study

As described in section 3.1, there is no currently active E&O program regarding F.O.G. and wash water management and disposal practices for fast-food restaurants. In 2013, a version of this program took place in response to an illicit discharge from an overflowing grease interceptor at a local fast-food business. The E&O program implemented following the discharge involved delivering an educational flier to local fast-food businesses, with no follow up visits.

A revamped E&O program addressing F.O.G. and wash water management and disposal practices for fast-food restaurants in the City of Ellensburg city limits will be implemented during the study. The E&O program will be implemented similarly to the E&O program implemented in 2013; specifically, the program will involve delivery of a flier to the fast-food restaurants identified for the study, following the baseline site visit. The lead entity or representative will be on-site to respond to any questions after the delivery of the flier.

The only difference between the revamped E&O program and the E&O program implemented in 2013 will be the increase in content related to F.O.G. and wash water disposal and management practices. The flier will include common infrastructure in fast-food restaurants for managing and

disposing of F.O.G. and wash water, as well as BMPs specific to each item identified by literature. A copy of the 2013 flier is included in Appendix B; a copy of the flier for the revamped E&O program is included in Appendix C.

7.5 Other E&O Programs

There are no other E&O programs in the study area which may influence the target audience's responses. This was ensured by involving fast-food restaurants only within City of Ellensburg, and excluding fast-food restaurants on the CWU campus, as they would have separate education and outreach programs that may possibly conflict with the study.

8.0 Instrument Design and Development

This section describes the instruments that will be used during the study, the procedures used to collect data, and the process used to validate the instruments. The instruments for this study will be the survey and observational data, which is recorded via a checklist included in the survey form. The survey can be found in Appendix D.

8.1 Instrument Design

The instrument utilized for this study will include a survey, which will be used to collect responses as well as observational data from all participating restaurants. This instrument was designed to meet the overall objectives of the study as well as the QA/QC objectives (Section 6.0). The following paragraphs describe the survey and interviews in detail.

The survey will be provided to management or other restaurant staff during an in-person site visit. A copy of the survey can be found in Appendix E. The survey consists of six sections, each of which contains questions related to a specific F.O.G. and wash water management and disposal practice. The development of the questions was guided by literature detailing proper practices, which is summarized in Section 3.3. The questions are worded using language accessible to the target audience (fast-food restaurant staff) to improve validity. Additionally, the questions were pilot tested by the consultant team (that wrote the QAPP) and City of Ellensburg during the development of this document to verify the interpretation of questions which supports the reliability of responses. The in-person surveys are expected to last 1 hour and contain open answer-style questions.

The survey questions were selected specifically to meet some of the objectives of the study including: understanding whether fast-food restaurant staff understand the impacts of F.O.G. and wash water on stormwater; understanding whether fast-food restaurants currently implement proper F.O.G. and wash water management and disposal practices; measuring adoption of targeted behaviors (use of proper practices); and evaluation of the effectiveness of the City's E&O program related to F.O.G. and wash water. The questions included in the survey were designed to collect this information as well as address the QA/QC requirements in Section 6.0.

Additionally, the surveys were designed to allow City staff providing the survey to record observations during the in-person site visit, and during drive-by inspections at another time (Section 8.2). Observational data will also be recorded through 1-2 photos taken during each of the baseline and follow-up observational site visits. The observational data is expected to improve the reliability and credibility of the data; specifically, observational data will be compared to coded survey responses during data analysis to verify survey responses and better understand a restaurant's understanding and adoption of targeted behaviors. It is also expected that by collecting observational data on a different date than survey responses, data collected will more accurately reflect what practices a restaurant is implementing on a daily basis.

In order to make accurate comparisons between baseline and follow-up survey data, it is important to attain enough responses. The goal is to obtain survey responses from all 20 fast-food restaurants identified for the study. There are several strategies that will be employed to achieve the desired response rate including survey design, clear communication regarding purpose of the survey, and targeted reminders. The survey was designed using language that is clear and concise for those

participating and the survey was validated by pilot testing the survey as described in Section 8.3. The site visit should take approximately 1 hour to complete. City staff will make an effort to schedule the in-person site visits after hours or not during mealtimes to facilitate participation (Section 8.2). In addition, City staff will clearly communicate that the visit is intended to aid in the development of a City E&O program and information gathered will not be used for enforcement. The City staff could also offer to help with any questions following the site visit to improve restaurant staff's willingness to participate. Finally, for restaurant staff who do not initially respond to phone calls, follow-up calls or emails will be sent at a different day and time than the initial call or any previous contact. Further information on the survey process can be found in the SOPs in Section 8.2.

8.2 Procedures for Collecting Data

Standard operating procedures (SOPs) will be used during this study to describe how data should be collected. The use of SOPs also addresses Section 6.0 DQIs for Reliability, Objectivity, and Integrity. The standard operating procedures (SOPs) that will be followed during this study include:

- Baseline Observational Site Visit
- Baseline Survey Site Visit and E&O Material Dissemination
- Follow-Up Survey Site Visit
- Follow-Up Observational Site-Visit

8.2.1 Baseline Observational Site Visit

This section describes the procedures for performing a drive-by inspection to obtain baseline observational data outside of the restaurant before the E&O program is implemented. The following steps will be repeated for each of the 20 participating fast-food restaurants.

- Step 1: City staff will select a day within a week prior to the scheduled baseline survey site visit to conduct a drive-by inspection. The City staff should not inform the participating restaurants about the drive-by visit.
- Step 2: During the drive-by, City staff will observe conditions listed in the observational checklist for dumpsters and cooking oil containers (in survey form, see Appendix D), as well as check the storm drain nearest to the dumpsters and cooking oil containers for evidence of illicit discharges. The staff should record all observational data suggesting whether the restaurant is following target BMPs. Observations will be recorded on the checklist and 1-2 photos will be taken at each restaurant to support written observations.

The observations from this baseline observational site visit will be recorded and saved for later access to compare data collected between site visits. See Section 10.0 and Section 13.0 for further detail on how observational data will be reported and used for the study.

8.2.2 Baseline Survey Site Visit and E&O Material Dissemination

This section describes the procedures for arranging the baseline site visit, communication of the intent of the site visit, inspection of F.O.G. and wash water disposal practices, completion of the

first survey, and dissemination of the E&O materials during the visit. These steps will be completed for each fast-food restaurant participating in the study.

- Step 1: Use the restaurant phone numbers provided by Participating Fast-Food Restaurant List (Appendix A) to contact a representative of each fast-food restaurant. Once connected, the caller will identify themselves and their organization and ask to speak with an individual in management regarding a non-enforcement education and outreach visit. If management is unavailable, or if there is no answer, leave a message listing name, position at City, contact information to return a call to, requesting a call back from management. Plan to call again within a few days if no call is returned and repeat until you are able to be in touch with management. Confirm with manager their name and the best mode of contact for future use. This information will be recorded in a copy of the Participating Fast-Food Restaurant List.
- Step 2: Once in contact with the manager, the caller will identify themselves and their organization and give the purpose for calling. Provide an overview of what the study would entail, stressing the fact that information collected during the study will not be used for enforcement. Ask the manager if they would be willing to answer a survey during two separate on-site visits for the study. If the manager accepts, schedule a day for the first on-site visit. Ask which days management are regularly scheduled, and when would be a convenient time. Try to select towards non-busy hours, or before/after business hours, as a tour of the kitchen will need to take place.
- Step 3: The lead entity representative will show up to the restaurant site on the agreed upon scheduled day and time, dressed in appropriate PPE. Ask for the manager, by name, who was contacted previously.
- Step 4: Re-introduce self to management and restate the reason for this visit. Remind management that the visit is intended to aid in the development of a City E&O program and information gathered will not be used for enforcement. The lead entity should request an opening and closing checklist of employee maintenance duties at this point if available.
- Step 5: Use the survey (Appendix D) to guide the site visit. Review the itemized list with management, so they can determine if additional staff are needed at that time. The survey can be completed in any order that is most efficient, so long as it is completed by the end of the visit. Record survey responses and observations made inside the restaurant on the survey. The following steps include specific information for each section of the survey:
 - Step 5.1: Employees:
 - Have a conversation with management to gauge their employees understanding and behaviors regarding F.O.G and wash water.
 - Step 5.2: Grease Trap:
 - Once the location of the grease trap has been identified, review the items of the survey in this category. Identify any barriers which may prevent these items from taking place.
 - Step 5.3: Grease Interceptor:

- Once the location of the grease interceptor has been identified, review the items of the survey in this category. Identify any barriers which may prevent these items from taking place.
 - Step 5.4: Used Cooking Oil Containers:
 - Once the location of the used cooking oil container has been identified, review the items of the survey in this category. Identify any barriers which may prevent these items from taking place.
 - Step 5.5: Dumpsters:
 - Once the location of the dumpsters has been identified, review the items of the survey in this category. Identify any barriers which may prevent these items from taking place.
 - Step 5.6: Mop Water:
 - Once the location of the mop sink has been identified, review the items of the survey in this category. Identify any barriers which may prevent these items from taking place.
 - Step 5.7: Fill out the fast-food businesses name, address, employee(s) present information, manager contact information, City inspector's name, signature, and date of inspection.
- Step 6: When all items on the survey have been reviewed, and the tour is complete, discuss any other potential barriers that might prevent the target behaviors from being adopted by restaurant staff. Record any additional barriers provided by management on the survey.
- Step 7: Provide the F.O.G educational flier to management. Discuss the details of the flier, highlighting on the importance of clean stormwater, how stormwater may be negatively impacted by a fast-food business, and how following BMPs will lessen these potential hazards. Answer any questions that may arise. Request that the flier to be posted in a location for all staff members to view, and that an all-staff be used meeting to discuss the items addressed on the visit.
- Step 8: Alert the manager that a follow-up site visit, repeating the same tour and survey, will need to be scheduled in the next few months, where the manager is to be present again at a convenient time. Remind the manager that the visit is intended to aid in the development of a City E&O program and information gathered will not be used for enforcement.
- Step 9: Thank the manager for participating in the study to complete the visit.

The observations and survey results from this baseline site visit will be recorded and saved for later access to compare data collected between site visits. See Section 10.0 and Section 13.0 for further detail on how survey and observational data will be reported and used for the study.

8.2.3 Follow-Up Observational Site Visit

This section describes the procedures for performing the second drive-by inspection to obtain follow-up observational data for BMP areas outside of the restaurant after the implementation of

the E&O program. These processes will be repeated for each of the 20 participating fast-food restaurants. The information gathered during this visit will partially determine if target behaviors have been adopted, and aid in measuring the effectiveness of the E&O program.

- Step 1: The staff will select a day within a week prior to the scheduled the follow-up survey site visit to conduct a drive-by inspection. The participating restaurant management should not be informed about the inspection.
- Step 2: City staff will observe conditions listed in the observational checklist for dumpsters and cooking oil containers (in survey form, see Appendix D) as well as check the storm drain nearest to the dumpsters and cooking oil containers for evidence of illicit discharges. During the drive-by, the staff should record all observational data suggesting whether the restaurant is following target BMPs. Observations will be recorded on the survey form in Appendix D, and 1-2 photos will be taken at each restaurant to support written observations.

The observations from this follow-up observational site visit will be recorded and saved for later access to compare data collected between site visits. See Section 10.0 and Section 13.0 for further detail on how observational data will be reported and used for the study.

8.2.4 Follow-Up Survey Site Visit

This section describes the procedures for arranging the second site visit, communication of the intent of the site visit, inspection of F.O.G. and wash water disposal practices, and completion of the follow-up survey.

- Step 1: Contact the manager who was present for the baseline site visit to schedule a follow-up site visit. This information should be provided on the baseline site visit's survey. If the manager or other staff have changed, note that the site visit will be conducted with new staff on the survey form. Ask the manager if they would be willing to answer the follow-up survey discussed during the previous visit. Remind the manager of the purpose of the visit, and that information collected during the visit will not be used for enforcement. If the manager accepts, schedule the visit on a day the manager will be present at the restaurant location during a slow part of their day, or before/after business hours, as a tour of the kitchen will need to take place. If the phone-call is unanswered, leave a message listing name, position at City, contact information, requesting a call back to schedule a follow-up site visit for the study. Plan to call again within a few days if no call is returned and repeat until able to reach management.
- Step 2: The lead entity representative will show up to the restaurant site on the agreed upon scheduled day and time, dressed in appropriate PPE. Ask for the manager, by name, who was dealt with previously during the baseline site visit. If the manager or other staff have changed, note that the site visit will be conducted with new staff on the survey form.
- Step 3: Reintroduce self to management and restate the reason for this visit. Remind management that the visit is intended to aid in the development of a City E&O program and information gathered will not be used for enforcement. The lead entity should request an opening and closing checklist of employee maintenance duties at this point if the duties have changed since the baseline site visit and if available.

- Step 4: Use the survey (Appendix D) to guide the site tour. Review the itemized list with management, so they can determine if additional staff are needed at that time. The survey can be completed in any order that is most efficient, so long as it is completed by the end of the visit. Record survey responses and observations made inside the restaurant on the survey. The following steps include specific information for each section of the survey:
 - Step 4.1: Employees:
 - Have a conversation with management to gauge their employees understanding and any change in behaviors regarding F.O.G and wash water.
 - Ask the manager roughly what percent of staff has left or been replaced since the previous site visit.
 - Step 4.2: Grease Trap:
 - Once the location of the grease trap has been identified, review the items of the survey in this category. Identify any barriers which may prevent these items from taking place.
 - Step 4.3: Grease Interceptor:
 - Once the location of the grease interceptor has been identified, review the items of the survey in this category. Identify any barriers which may prevent these items from taking place.
 - Step 4.4: Used Cooking Oil Containers:
 - Once the location of the used cooking oil container has been identified, review the items of the survey in this category. Identify any barriers which may prevent these items from taking place.
 - Step 4.5: Dumpsters:
 - Once the location of the dumpsters has been identified, review the items of the survey in this category. Identify any barriers which may prevent these items from taking place.
 - Step 4.6: Mop Water:
 - Once the location of the mop sink has been identified, review the items of the survey in this category. Identify any barriers which may prevent these items from taking place.
 - Step 4.7: Fill out the fast-food businesses name, address, employee(s) contact information, manager contact information (especially if a new manager is present), City inspector's name, signature, and date of inspection.
- Step 5: When all items on the survey have been reviewed, and the visit is complete, discuss any newly discovered potential barriers that might prevent the target behaviors from being adopted by restaurant staff. Write down any barriers provided by management.

- Step 6: Answer any questions that may arise. Supply management with additional educational fliers as needed to be posted for staff to review.
- Step 7: Thank the manager for participating in the study. The visit will then be complete.
- Step 8: Repeat steps 1-7 for all twenty fast-food restaurants.

The observations and survey results from this second site visit will be recorded and saved for later access to compare data collected between site visits. See Section 10.0 and Section 13.0 for further detail on how survey and observational data will be reported and used for the study.

8.3 Instrument Validation

Validation is the process to verify the instrument measures what it was intended to measure and produces stable results. The survey and observational data checklist will be validated using pilot testing. Pilot testing includes staff from Osborn Consulting and City of Ellensburg taking the survey. Then these groups met to compare their interpretation of the questions. Where there are differences in the interpretation of the questions, the group discussed their interpretation and modified the questions until they mutually agree on the interpretation of the wording. In addition, input from the TAG members was also used to refine survey questions and will be used to refine the observational checklist language.

9.0 Quality Control

The purpose of this section is to describe the QC procedures that will be employed during the study to minimizing errors and support the integrity of the data through the process of collecting, recording, and analyzing data [5]. This section describes the procedure for addressing Section 6.0 DQI/MPC for Completeness.

9.1 Study QC Procedures

For all the data that will be created during this study, the following quality control procedures will be implemented to assure data reliability, integrity, and objectivity:

- SOPs were developed (Section 8.2) that define procedures for collecting data. Prior to the start of data collection, all staff who collect data will be trained on the SOPs to ensure consistent responses.
- Data recording and reporting procedures were developed and will be consistently followed (Refer to Section 10.0 Data Management Plan Procedures).
- Standard forms for data collection during interviews will be developed and consistently used to collect interview responses (see Section 10.0)
- Audits will be performed to verify that QAPP is being followed (Section 11.0)
- The Lead Entity's inspector will be the same individual for each study location, being the only individual recording data throughout the study.

9.2 Corrective Action

Correction actions are developed when it is found (through audits for example) that part of the QAPP is not being followed. If a problem is identified, each issue will need to be evaluated to determine the potential impact on the project which may include flagging data, rejecting data, and developing a corrective action plan to prevent these issues from occurring again. If problems arise during the study, a corrective action plan will be developed that includes procedures that will be followed to correct or compensate for problems. All corrective actions will be summarized in the table located in Appendix F and included in the final report. Examples of a corrective action include:

- Responses to survey questions suggest that the respondents may have had varying interpretations of questions. Corrective action may include asking participants during the post survey to explain how they interpreted the question. If it is found that respondents had different interpretations, the survey question may be rejected, or a follow up survey will be conducted to verify responses.
- SOPs not followed during the observational data collection process. For this example, the issue would be documented, the data collected would be flagged, and the person leading the interviews would be retrained or replaced.

10.0 Data Management Plan Procedures

This section defines the data management plan, specifically how the data collected and other important project documents will be managed, stored, and archived during the study. The purpose of the data management plans is to reduce the potential for errors during the data collection and analysis phases of the project; this also ensures that should an unanticipated change in Key Team Members takes place, the project can be more easily continued by a new team member. This section describes the procedure for addressing Section 6.0 DQI/MPC for Integrity.

10.1 Data Identification

The data in this study will not be under any confidentiality. The final page of the fast-food restaurant F.O.G. E&O program survey contains spaces to fill in information pertaining to each study location including information of those who were present at time of inspection. This information provided will ensure that the data collected from each individual restaurant visit's survey will coordinate to that particular site visit and location.

Each page of the survey specifies for one particular area of BMPs. There is a checklist of items for the Lead Entity's inspector to ask the manager while completing the baseline and second site visit. There are cells provided for the inspector to write down the answers given by the restaurant manager. Below the checklist table are cells to write down any barriers the restaurant manager mentions that prohibit a BMP from being followed. This information provided by the restaurant manager will be referred to as survey data. Observational data will also be recorded. This will be recorded in a separate table provided for the inspector to write down any notable observations of the state of the areas in which BMPs reside. This can be either positive or negative details contributing to the quality of stormwater flowing from the restaurant. The purpose for taking both survey and observational data is to establish integrity of data, as word of mouth answers provided from restaurant management may not be entirely credible.

10.2 Data Recording & Reporting Requirements

- A survey template has been created for this study that details site visit information (Appendix D). The Lead Entity's inspector will fill in this data at the time of inspection. The filled in survey will provide the restaurant name, address, present manager(s) name(s), manager contact information, inspector name and job title, inspector signature, and date of inspection. The remainder of the survey consists of checklists pertaining to BMPs within specific areas of the fast-food restaurant. These checklists identify specific BMPs for the inspector to review the area for that may impact stormwater quality. Each BMP on the checklists coordinates with a non-leading question for the inspector to ask the restaurant manager who is leading the tour. The restaurant manager's response will be recorded in the cell directly next to each question. If any evidence in the restaurant's BMP area does not exemplify that the survey response pertaining to the BMP was accurate, that is to be recorded in the appropriate observational data table on the survey. Any other notable observations within these areas should be recorded in the same table. If the observational data differs from management responses, the observational data will be used for analysis of the effectiveness of this E&O program rather than the raw survey data. Having this observational data to compare against the survey data will provide data integrity where the study can detect and correct error in management responses.

- If the manager identifies any barriers as to why any BMP does not take place, this is recorded in the survey data table in the “Barriers” cells. This data is considered survey data, but will not receive any point value system. Rather, this information will be used to provide the City with insight on how to recommend corrective actions pertaining to their E&O program.
- The Lead Entity Project Manager is responsible for saving notes detailing survey responses (as applicable). The Lead Entity Project Manager is also responsible for transferring data from the survey to Excel Spreadsheets for analysis. The data verifiers (see Section 5.0) are responsible for verifying that the data collected in from the survey has been correctly transferred in the Excel format.

10.3 Procedures for Missing Data

Any data missing on the data collection forms will be documented in the Excel spreadsheet by coding the data as M (for missing). In addition, a note will be added to the spreadsheet explaining the reasons why the data is missing (if known). Missing data will be reported in the final technical report along with a description of how the data set was analyzed without the missing data.

10.4 Acceptance Criteria for Existing Data

This section is not applicable to this study. No existing data will be used to evaluate effectiveness of this E&O program. All data that will be used to evaluate effectiveness will be collected during this study.

11.0 Audits

This section identifies the audits that will be conducted during the study and defines the procedures for conducting the audit. The auditor(s) as defined in Section 5.1 is responsible for conducting each audit. Qualitative audits will be performed to verify that the study is conducted in conformance to the QAPP. For the Eastern Washington Effectiveness studies, audits will be conducted by the auditors defined in Section 5.0. A copy of the Audit Checklist for this study can be found in Appendix H.

Audits that will be conducted include:

- Verify that the SOPs are followed for data collection and data recording in Section 8.2
- Verify the data management procedures defined in Section 10.0 are followed
- Each audit will include:
 - Interviewing the Lead Entity PM (and anyone else who is participating in conducting in-person surveys) regarding the SOPs they are following during data collection and comparing their responses to the SOPs
 - Interviewing the Lead Entity PM (and anyone else who is participating in data management) regarding their data management procedures and comparing interview responses to the Data Management Plan in Section 10.0
 - Reviewing the electronic files to verify that the data management procedures are followed
 - Where a discrepancy is found, reference Section 9.2 for the process of developing a corrective action plan

Audits will be conducted four times according to the following schedule:

- Prior to use of the checklist for observational data
- Prior to use of the checklist for survey data
- Following the use of the checklist for observational data
- Following the completion of 2 or 3 baseline site visit surveys

12.0 Data Verification and Usability Assessment

This section defines the process that the project will employ to verify the instruments, evaluate the quality of the data, and evaluate the usability of the data for meeting the project objectives. The process for validation of the instrument (survey) is provided in Section 8.3. This section defines the process to determine if the Section 6.0 measurement performance criteria (MPCs) are met for the relevant data quality indicators (DQIs).

12.1 Data Verification

This section describes the process that will be employed to evaluate the quality of the data created during the study and identify responsible party for verifying the data. Verification of the data will be performed by a person other than the one collecting and analyzing the data. For example, the Data Verifiers listed in Table 5.1. The data verification process may include:

- Review all the data records to ensure they are consistent, correct and complete, with no errors or omissions
- Review the results from the QC section
- Review the results from the audit section
- Examine data to determine if MPC's were met
- Peer debriefing will be used to validate coding of responses and barriers identified during the site visits: one researcher will code the data and provide two other researchers with their coding, which they will use to code a portion of the data. The researchers will meet to compare their results until they mutually agree on the interpretation of the coding including adding additional codes. Reference Section 13.3 for more details.

12.2 Data Usability Assessment

This section describes the process and procedures that will be used to establish the usability of the data for meeting the project objectives. This should include:

- Results from the data verification
- Results from the audit (Section 11.0 of the QAPP)
- Whether the MPCs for the project (described in QAPP) have been met. Generally, if the MPCs have been met, then data should be of sufficient quality to be usable for meeting project objectives. If the MPCs have not been met for data, the user will need to decide if the data is still usable or reject the data.

13.0 Data Analysis Methods

13.1 Qualitative Data Analysis Methods

The raw data collected during the study will be in the form of qualitative data. Survey responses and observational data will therefore be coded to analyze the data. Qualitative data analysis will follow these steps:

1. Transcribe the data from each source (i.e. type up responses from surveys, observations) into an Excel spreadsheet
2. Data will be organized by source (i.e. survey or observation), by each BMP, and by visit (baseline [before implementation of E&O program] or follow-up [following implementation of E&O program])
3. Review and code each response into the following categories:
 - Adoption of BMP - Any BMP properly implemented (according to the literature) by fast-food restaurant staff to the full extent
 - Partial adoption of BMP - Any BMP partially implemented, either intermittently or not to the full extent of how the literature defines correct practices
 - No adoption of BMP - Any BMP that is not currently being implemented by the fast-food restaurant staff at any extent.
4. After the data have been coded, a peer debriefing process will follow to verify the coding. This will include having two or three other researchers (i.e., data verifiers) review the codes and separately code 30% of the data. Then the data verifiers will compare their results and where they do not have similar responses, they will discuss their interpretation of the codes until they mutually agreed on the coding.
5. Once the data have been coded and verified, the codes for observational and survey data for each BMP at each restaurant will be compared. Specifically, if the observational data coding and survey data coding match, the observational data will be used to corroborate the survey data. If the observational data coding does not match the survey data coding for a particular BMP at a particular restaurant, the data will be flagged to qualify that there was a discrepancy between the verbal survey response and observed condition of the BMP. Both sets of data will be quantitatively analyzed to determine if the MPCs are met.

13.2 Quantitative Data Analysis Methods

Quantitative data generated from qualitative data will be used to evaluate the effectiveness of the E&O program. Quantitative data analysis will follow these steps:

6. The coded data will be quantitatively analyzed using a Likert Scale and statistical analysis of significance (Section 13.3). The frequency of each code will be measured using a three-point Likert scale (-1, no adoption of BMP; 0, partial adoption of BMP; and 1, adoption of BMP). Each BMP at each restaurant will be assigned a value. As

mentioned in Section 13.1, both survey and observational data. If the values for observational and survey data match, it will be assumed that the MPC for reliability, integrity, and xx are met. If observational data and survey data do not match, they will be flagged, and social desirability bias will be assessed to determine whether data can be accepted.

7. The survey and observational values for each fast-food restaurant will be summed for the baseline visits separately from the visits following implementation of the E&O program. The sum of the values will thereby represent the number of BMPs adopted by each restaurant at the start and end of the study.
8. Percent change during the study will be calculated for the BMPs at each restaurant. The following formula will be used:

$$\text{Percent Change} = \frac{(x_2 - x_1)}{x_1}$$

x_1 = original value assigned for BMP adoption at fast-food restaurant

x_2 = value assigned following implementation of E&O program

Following the quantitative analyses outlined in this section, data will be analyzed further by statistical methods (Section 13.3).

13.3 Hypothesis Testing

A statistical comparison will be conducted to determine whether there was a statistically significant difference between the number of BMPs implemented during the baseline visits and the visits following implementation of the E&O program. The method of converting survey responses and observational data to quantitative data to be used in the statistical comparison is described further in Sections 13.1 and 13.2. A nonparametric Mann-Whitney U-test was used to assess the statistical significance of the pre and post responses. This test was selected because the analysis is not based on the assumption of normal distribution and the test assumes only an ordinal measurement of the data based on the ranking scale selected (Takona, 2002). The significance level is identified as follows: $p < 0.05$, statically significant; $0.05 > p < 0.10$, weakly significant; and $p \geq 0.10$, not statically significant. The specific null hypothesis (H_0) and alternative hypothesis (H_a) evaluated are noted below.

- H_0 : No change in adoption of targeted behaviors
- H_a : Number of targeted behaviors adopted at end of study is greater than number of targeted behavior adopted at beginning of study

13.4 Data Presentation Methods:

The purpose of this section is to describe how the data will be presented (i.e. tables, charts, and/or graphs) in the final reports to illustrate trends, relationships, and anomalies. Data collected during this study will be presented primarily in tables, bar-chart, or pie-style graphics to illustrate key findings.

Data will be depicted in graphics if the data warrant visual representation. For example, Figure 13.4.1 is a pie graph that illustrates the number of fast-food restaurants that identified employee lack of awareness of proper procedures as a barrier to implementing BMPs related to F.O.G. and wash water management. Figure 13.4.2 is a bar graph which illustrates the change in adoption of fast-food restaurants' dumpster and waste cooking oil container BMPs.

Tables which summarize data will also be used. For example, Table 13.4.1 summarizes the level of BMP adoption during the study. Table 13.4.2 summarizes the change in adoption of each BMP during the study, and whether there was a statistically significant difference in adoption from the start to the end of the study.

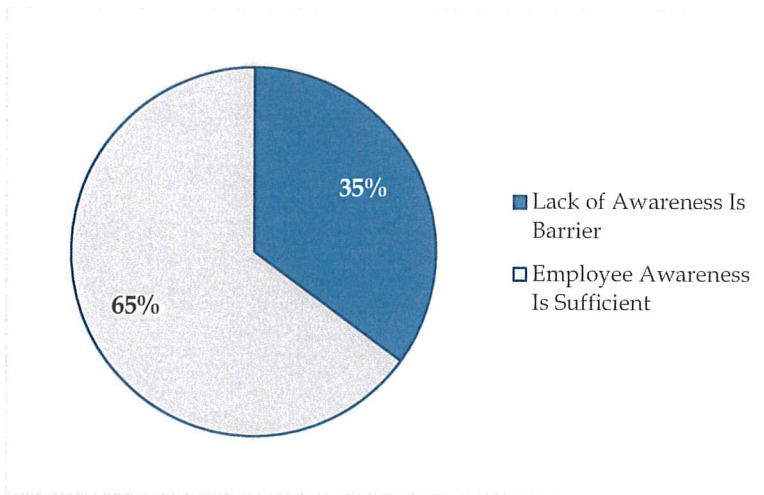


Figure 13.4.1 Employee Awareness as Barrier to BMP Implementation

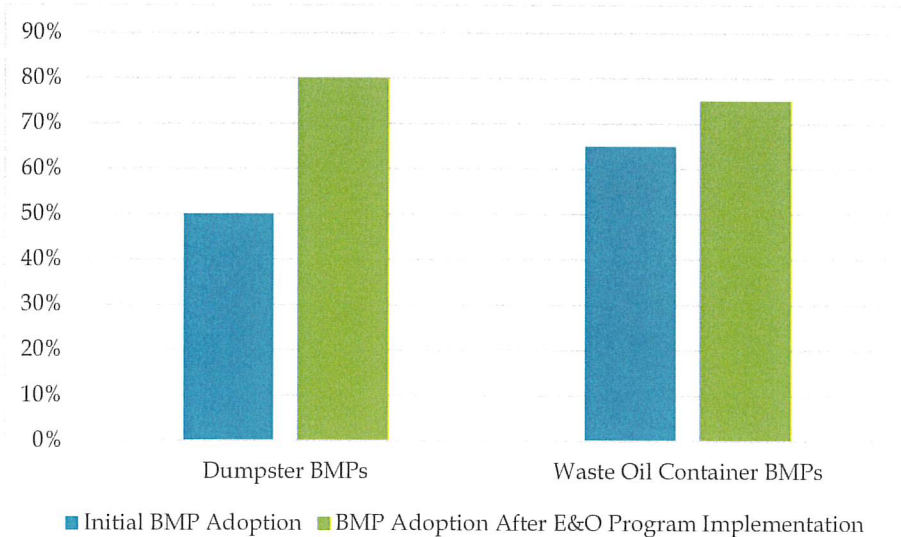


Figure 13.4.2 Adoption of Dumpster and Waste Oil Container BMPs During Study

Table 13.4.1 Summary of Average BMP Adoption During Study

Level of BMP Adoption	
Average Initial Value ¹	Average Final Value ¹
19	29

¹ Maximum value that can be achieved is 36.

Table 13.4.2 Summary of Specific BMP Adoption During Study

BMP Type	Level of BMP Adoption		Statistically Significant Change?
	Average Initial Value	Average Final Value	
Grease Trap BMPs	25	30	Yes
Grease Interceptor BMPs	22	23.5	No
Used Cooking Oil Container BMPs	21	26	Yes
Dumpster BMPs	17	27	Yes
Mop Water BMPs	15.5	30	Yes
Employee Awareness/Training	11.5	29	Yes

14.0 Reporting

This section describes how the study findings have been reported and disseminated.

14.1 Final Reporting

This section identifies the reports that are required for the project and the party responsible for preparing the reports. Reports required by the MS4 permit include:

- Annual Reports (Permit Section S8.B8) – interim results will be described, and status of the study will be documented by the Lead Entity.
- Final Report (Permit Section S8.B10) – final results of the study as well as the recommendations for future actions based on the findings will be documented by the Principal Investigator within the Final Report. For the final report, an outline will be provided that identifies the contents of the final report (see Table 14.1 for proposed content).
- Study Fact Sheet – key points of the study and study findings will be summarized by the Principal Investigator in a fact sheet.

Table 12.2 Proposed Effectiveness Study Report Content

Final Report Sections	Effectiveness Studies
0.0 Cover Letter	ü
1.0 Executive Summary	ü
2.0 Introduction	See Note 1
3.0 E&O Program Description	See Note 1
4.0 Data Collection Procedures	See Note 1
5.0 Data Summaries and Analysis	ü
6.0 Discussion	ü
7.0 Conclusions	ü
8.0 Future Action Recommendations	ü
9.0 Appendices	ü

1. Reference the approved QAPP for these sections. Indicate any changes made to the study since the QAPP was approved.

14.2 Dissemination of Project Documents

The Study Design Proposal and QAPP will be shared with those included on the Distribution List and posted to the City of Ellensburg website (<https://ci.ellensburg.wa.us>) along with the final report and fact sheet at the completion of the study.

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16.0 Appendices

Appendix A: Participating Fast-Food Restaurant List

RESTAURANT LIST

Categories	Restaurant Name	Restaurant Address
Drive-Thru	Dairy Queen	1601 N Currier St, Ellensburg, WA 98926-8345
Drive-Thru	Jack in the Box	115 W University Way, Ellensburg, WA 98926
Drive-Thru	Dairy Queen	1101 E University Way, Ellensburg, WA 98926
Drive-Thru	Carl's Jr.	1303 S Opportunity St, Ellensburg, WA 98926
Drive-Thru	McDonald's	1304 Canyon Rd, Ellensburg, WA 98926
Drive-Thru	Arby's	1404 S Canyon Rd, Ellensburg, WA 98926
Drive-Thru	Taco Bell	1406 S Canyon Rd, Ellensburg, WA 98926
Drive-Thru	Burger King	1410 Canyon Rd, Ellensburg, WA 98926
Drive-Thru	Wendy's	1510 S Canyon Road, Ellensburg, WA 98926
Drive-Thru	Taco del Mar	1614 Canyon Rd, Space 102, Ellensburg, WA 98926
Drive-Thru	Sonic Drive-In	1802 S Canyon Rd, Ellensburg, WA 98926
Food-Truck	Tacos Chalitos 2	601 W University Way, Ellensburg, WA 98926
Food-Truck	Los Chilangos Food Truck	310 S Main St, Ellensburg, WA 98926
Food-Truck	Fidelina's	410 S Main St, Ellensburg, WA 98926
Food-Truck	Tacos Chalito	209 S Main St, Ellensburg, WA 98926
Pizza	Pizza Hut	805 N A St, Ellensburg, WA 98926
Pizza	Domino's Pizza	710 N Anderson St, Ellensburg, WA 98926
Sit-Down	IHOP	2704 Triple L Loop, Ellensburg, WA 98926
Within Store	Arby's	1307 N Dolarway Rd, Ellensburg, WA 98926
Within Store	Cinnabon	1307 N Dolarway Rd, Ellensburg, WA 98926

Appendix B: 2013 Fast-Food Restaurant FOG E&O Program Flier

Cleaning the grease trap often reduces the chance of sewer backup and stops fats, oils and grease (F.O.G.) from entering the public storm system.

It's advised to inspect your grease trap often to prevent backups



NO GREASE



F.O.G. needs to be disposed of into waste oil containers onsite and never pour down the sink or floor drain or outside in the storm drain.

F.O.G. not disposed of properly can cause plumbing problems and it's expensive to repair



Never pour mop water down the storm drain. Mop water needs to be poured down the sink, floor or janitors drain inside the restaurant.



NO
NEVER pour or wash anything into a storm drain!

CLEANING UP?

NOTHING BUT RAIN DOWN THE STORM DRAIN

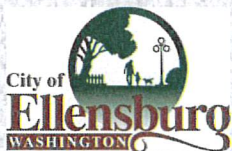
YES
Dispose of mop water in a utility sink that is properly connected to the sanitary sewer.

STORMWATER RUNOFF IS NOT TREATED and is the leading source of water pollution in our community. Runoff flows directly from the storm drain into local streams and lakes.

Many business activities can contribute to stormwater pollution. YOU can help keep pollutants out of our streams and lakes and reduce the hazards to people and fish!

Remember - Nothing But Rain Down The Storm Drain.

Call City of Ellensburg at 509-925-8634 for more information



A public service message
from the City of Ellensburg
Stormwater Utility

Appendix C: New Fast-Food Restaurant FOG E&O Program Flier

CLEAN PIPES START WITH YOU!

CLOGGED PIPES LEAD TO CLOSED BUSINESSES. DO YOUR PART TO PROTECT YOUR BUSINESS AND THE ENVIRONMENT.

DUMPSTERS & USED COOKING OIL CONTAINERS:

WHAT'S WRONG: CONTAINERS ARE OPEN AND OVERFLOWING
LET'S FIX IT: KEEP CONTAINERS CLOSED AND MAINTAINED TO PREVENT SPILLS



WHY DOES THIS MATTER?
STORM DRAINS SEND WATER DIRECTLY TO OUR RIVERS, STREAMS, AND OCEANS WITHOUT PRETREATMENT. WHATEVER GOES DOWN THE DRAIN ENDS UP IN OUR WATER BODIES!

MOP / FLOOR SINK:
WHAT'S WRONG: SINK IS BLOCKED
LET'S FIX IT: KEEP SINK CLEAR AND ONLY POUR MOP WATER DOWN THE DRAIN



UNSURE? CHECK YOUR EMPLOYEE TRAINING MANUAL!

MOP WATER:
WHAT'S WRONG: CLEANING CHEMICALS ARE BEING DUMPED INTO THE STORM DRAIN
LET'S FIX IT: ONLY RAIN GOES DOWN THE STORM DRAIN

GREASE TRAP
WHAT'S WRONG: CONTAINER IS FULL AND OVERFLOWING
LET'S FIX IT: CLEAN GREASE TRAPS EACH WEEK AND DISPOSE CONTENTS INTO USED OIL CONTAINER BEFORE IT IS FILLED

GREASE INTERCEPTOR
WHAT'S WRONG: OPEN MANHOLE LID
LET'S FIX IT: SECURE LIDS AND ENSURE EMPLOYEES CAN SAFELY OPEN LIDS FOR INSPECTIONS

GREASE INTERCEPTOR
WHAT'S WRONG: CONTAINER IS FULL AND OVERFLOWING
LET'S FIX IT: CHECK GREASE LEVEL AT LEAST ONCE EACH MONTH. CLEAN IF FILLED OVER 25%

SEWER

SEWER



IF YOU SEE A SPILL, **SPEAK UP**

REPORT A SPILL: 509.962.7230
CITY OF ELLENSBURG, 2021

Appendix D: City of Ellensburg FOG E&O Program Survey

City of Ellensburg F.O.G. E&O Program Survey

This survey will aid in measuring the implementation of desired behaviors enacted by the 2021 Fats, Oils, & Grease (F.O.G.) education and outreach study.
This tool is to be used as an educational document and is not intended to be used for enforceable action.

Employees

Survey:

Table 1.1: Employment items to review with management during site visit.

Parameter:	Answer:
<ul style="list-style-type: none"> <input type="radio"/> What are the impacts of F.O.G./wastewater if they reach the storm system? <input type="radio"/> For how many employees is English not the first language? What is their first language? <input type="radio"/> How are employees educated on F.O.G./wastewater disposal? <input type="radio"/> How often are employees trained on F.O.G. & wastewater management? <input type="radio"/> Are specific employees trained to inspect and clean the grease trap and interceptors? <input type="radio"/> Is there an employee training log? <input type="radio"/> How frequently is it updated? <input type="radio"/> Is there a SW O&M user manual for the following BMPs? <input type="radio"/> What does a spill look like? <input type="radio"/> What do employees do if a spill occurs? <input type="radio"/> Is there a spill kit on the premises? <input type="radio"/> Can you show me your spill kit? <input type="radio"/> How often are the contents of the spill kit replenished? <input type="radio"/> Where is the spill hotline information posted? 	<p>Items to check for during site visit:</p> <p>Employees understand the importance of proper F.O.G. & wastewater disposal</p> <p>Employees are trained on practices regarding F.O.G. & wastewater</p> <p>A detailed employee training log is kept to ensure all employees are trained on F.O.G. & wastewater BMPs</p> <p>Employees follow proper F.O.G. & wastewater practices</p> <p>Employees understand what a spill is & the emergent need for cleanup</p> <p>If a spill occurs, attempt to contain the spill with a spill kit and report the spill immediately by calling the City's spill hotline.</p>
<p>Barriers: List any barriers to implementing dumpster BMPs</p>	
1.	
2.	
3.	

City Observations:

Table 1.2: List observations of employee BMPs.

Observations:
1.
2.
3.
4.

Grease Trap

Survey:

Table 2.1: Grease trap items to review with management during site visit.

Parameter:	Answer:
<input type="radio"/> Is there a grease trap?	
<input type="radio"/> Can you show me the location?	
<input type="radio"/> How often does the grease trap leak: Always, Sometimes, Never	
<input type="radio"/> How is the grease trap opened?	
<input type="radio"/> Are employees trained to open the grease trap?	
<input type="radio"/> How often are the levels in the grease trap checked?	
<input type="radio"/> At what level (0-100% full) is F.O.G. waste cleaned out?	
Barriers: List any barriers to implementing grease trap BMPs	
1.	
2.	
3.	
4.	

Items to check for during site visit:

- Establishment has a grease trap connected to the dishwashing sink
- Grease trap has no leaks or defects
- Proper equipment is located near grease trap to ensure it is easily accessible & easily opened
- Grease trap levels checked at least once per week
- Contents are disposed of when they are 25-33% full

City Observations:

Table 2.2: List observations of grease trap BMPs.

Observations:
1.
2.
3.
4.



Grease Interceptor

Survey:

Table 3.1: Grease interceptor items to review with management during site visit.

Parameter:	Answer:
<ul style="list-style-type: none"> <input type="radio"/> Is there a grease interceptor? <input type="radio"/> Can you show me the location? <input type="radio"/> How frequently are inspections of the grease interceptor completed? <input type="radio"/> What do you look for during your inspections? <input type="radio"/> If defects are apparent during the inspection, how soon is maintenance scheduled? <input type="radio"/> Are manhole lid positions included in the inspection? <input type="radio"/> Is rainwater able to get into grease interceptor from manhole lids? <input type="radio"/> If employees are trained to access the grease interceptor, what are those steps? <input type="radio"/> How often are overflows of grease interceptor manhole lids observed? <input type="radio"/> Is there an inspection log? <input type="radio"/> How frequent is the inspection log updated? <input type="radio"/> How do they determine when to clean (i.e. timeframe, odor, percent full, etc.)? <input type="radio"/> If by %, what % (0-100% full) are settled solids and floating F.O.G. cleaned out? 	
Barriers: List any barriers to implementing grease interceptor BMPs	
1.	
2.	
3.	
4.	

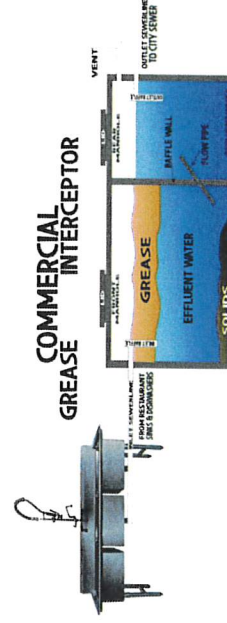
Items to check for during site visit:

- Grease interceptor is installed
- Inspections of grease interceptor are completed quarterly
- Maintenance is scheduled immediately if any defects are apparent
- Access manhole lids are kept in sealed position
- Access manhole lids are able to be opened by trained employees
- Visually check the area for surcharges weekly
- Maintain a log of all inspection and maintenance task details
- Cleaned once every three months, or if there appears to be settled solids and a floating F.O.G. layer that have filled over 25% operating depth of interceptor, or if there is an apparent odor

City Observations:

Table 3.2: List observations of grease interceptor BMPs.

Observations:
1.
2.
3.
4.



Used Cooking Oil Containers

Survey:

Table 4.1: Used cooking oil container items to review with management during site visit.

Parameter:	Answer:
<ul style="list-style-type: none"> <input type="radio"/> Where are liquid & solidified F.O.G. waste disposed of? 	
<ul style="list-style-type: none"> <input type="radio"/> Where are containers located? <input type="radio"/> Can you show me the location? 	
<ul style="list-style-type: none"> <input type="radio"/> How do you determine when used cooking oil containers are scheduled to be picked up? (i.e. odor, by % full, overflowing, etc.) 	
<ul style="list-style-type: none"> <input type="radio"/> What is the protocol for containers with defects? 	
<ul style="list-style-type: none"> <input type="radio"/> Are container lids left open or closed when not in use? 	
Barriers: List any barriers to implementing used cooking oil container BMPs	
1.	
2.	
3.	
4.	

Items to check for during site visit:

- Liquid & solidified F.O.G. are disposed of into on-site used cooking oil containers (not in sink, drain, storm drain, parking lot, street, etc.)
- Container is not located on top of a storm drain or impeding natural storm flow, and is located under a covered area where possible
- Used cooking oil containers are scheduled for pick-up before they are full, or if there is an apparent odor. Grease stains should not be present on the ground surrounding the container.
- Containers are in good condition and are not leaking
- Containers are closed when not in use

City Observations:

Table 4.2: List observations of used cooking oil container BMPs.

Observations:
1.
2.
3.
4.



Dumpsters

Survey:

Table 5.1: Dumpster items to review with management during site visit.

Parameter:	Answer:
<input type="checkbox"/> Where are dumpsters located?	
<input type="checkbox"/> Can you show me dumpster(s) in relation to the storm drain?	
<input type="checkbox"/> Are dumpster container lids left open or closed when not disposing of trash?	
<input type="checkbox"/> What is done with garbage when the dumpster is full?	
<input type="checkbox"/> What do you do if the dumpster leaks?	
<input type="checkbox"/> Are dumpster cleaned?	
<input type="checkbox"/> If so, how and how often?	
<input type="checkbox"/> If so, where does washwater flow?	
Barriers: List any barriers to implementing dumpster BMPs	
1.	
2.	
3.	
4.	

Items to check for during site visit:

Containers are not located on top of storm drain or impeding natural storm flow, and are located under a covered area where possible

Containers are closed when not in use

Containers are not overflowing and trash is not on the ground in dumpster area

Containers are in good condition and are not leaking

No evidence of containers being pressure washed so washwater will flow into storm drain

City Observations:

Table 5.2: List observations of dumpster BMPs.

Observations:
1.
2.
3.
4.



Mop Water

Survey:

Table 6.1: Mop water items to review with management during site visit.

Parameter:	Answer:
<input type="checkbox"/> Where is mop water disposed of?	
<input type="checkbox"/> Can you show me the location?	
<input type="checkbox"/> Where are mops and other equipment hosed down?	
<input type="checkbox"/> Can you show me the location?	
<input type="checkbox"/> If there is a utility drain, is there a cleared path to the utility drain?	
<input type="checkbox"/> Where are cleaning chemicals stored?	
<input type="checkbox"/> Can you show me the location?	
<input type="checkbox"/> Is there secondary containment?	
Barriers: List any barriers to implementing dumpster BMPs	
1.	
2.	
3.	
4.	

Items to check for during site visit:

Mop water is poured down the sink, floor, or janitor's drain (not down the storm drain, into the parking lot, onto the street, etc.)

Mops and other equipment are cleaned/hosed down in sink (not down the storm drain, into the parking lot, onto the street, etc.)

Utility drain is kept clear to aid in ease of use

Cleaning chemicals are not coming into contact with stormwater, nor are they entering the stormwater system:

- Chemicals are stored in secondary containment out of rain and away from stormwater system
- Chemical storage containers have no defects or leaks

City Observations:

Table 6.2: List observations of mop water BMPs.

Observations:
1.
2.
3.
4.



Restaurant Name: _____

Address: _____

Manager(s) Name(s): _____

Manager Contact Information: _____
(Day Phone & Email)

Inspector Name & Job Title: _____

Inspector Signature: _____

Date of Inspection: _____

Appendix E: Ecology Comment Form

Comment Number	Commenter Initials	Document Reviewed	Pages Number	Section Number or Title	Comment	Suggested Revision	OCI Response
1	AJ	Effectiveness Study QAPP	7	2.0 Executive Summary	3rd line of 1st paragraph	change designated to required There will be two observational drive-by inspections and two in-person survey site visits. The first survey is just before the education lesson to assess baseline practices at the restaurant and at the second survey is a few months after the E&O program is implemented (follow-up). The first site visits will include...	Will revise according to track changes.
2	BL	Effectiveness Study QAPP	7	2.0 Executive Summary	4th paragraph, these edits are to help separate the two distinct actions during each site visit survey and education		Will revise according to track changes.
3	AJ	Effectiveness Study QAPP	8	3	Has there been a F.O.G. program in place with the treatment plant? We recommend mentioning it, if there has been one, and reiterate this program is for the E&O and IODE for the MS4 permit.		There has not been a program implemented by the treatment plant (currently or in the past).
4	BL	Effectiveness Study QAPP	9	3.3.1 Results of Prior Studies	Correct font of first paragraph		Font corrected to match rest of document.
5	BL	Effectiveness Study QAPP	13	4.2 Study Description and Objectives	is the audience really all of the staff, managers and the employees. Maybe this is too fine a line. Most of the rest of this QAPP uses employees or staff interchangeably.	target audience is fast-food restaurants staff (management and employees).	Will revise in 4.2 and clarify target audience in QAPP and who is surveyed.
6	AJ	Effectiveness Study QAPP	13	4.2 Study Description and Objectives	To provide clarity that the City of Ellensburg is the only entity in the study, add a superscript with definition of lead entity as in Section 5.0, or refer to Section 5.0 for lead entity definition.		Section 5.0 referred to after "lead entity".
7	BL	Effectiveness Study QAPP	13	4.2 Study Description and Objectives	3rd paragraph	During the first site visit, the lead entity will tour the restaurant with management and complete a survey which determines whether the restaurant is implementing BMPs for F.O.G. and wash water.	Will clarify that this is the baseline site visit, and indicate in parentheses that it is the first site visit.
8	BL	Effectiveness Study QAPP	13	4.2 Study Description and Objectives	3rd paragraph	The survey completed during this first site visit will provide a baseline evaluation of whether restaurants are following appropriate BMPs and identify any existing barriers.	Will clarify that this is the baseline site visit, and indicate in parentheses that it is the first site visit.
9	BL	Effectiveness Study QAPP	13	4.2 Study Description and Objectives	4th paragraph	Following completion of the survey at this first site visit, the lead entity will provide a filer containing information about the BMPs the restaurants should be implementing.	Will clarify that this is the baseline site visit, and indicate in parentheses that it is the first site visit.
10	AJ	Effectiveness Study QAPP	14	4.3 Study Location and/or Target Population	Are the taco trucks continually parked in a designated place, or are they transitory?		The taco trucks are always located in the same spot, or are physically connected to the adjacent building. Revised first paragraph text to say "local stationary taco trucks."
11	BL	Effectiveness Study QAPP	16	Table 4.4 Data Needed to Meet Objective	Explain the purpose of "rule out social desirability bias"		Will revise to "Rule out social desirability bias (see Section 6.0). Observational data will be used to verify survey responses provided by fast-food restaurant management or staff."
12	BL	Effectiveness Study QAPP	16	Table 4.4 Data Needed to Meet Objective	3rd line under "Purpose"	Measure baseline use of targeted behaviors	Will revise to "Measure baseline use of targeted behaviors before E&O program can influence behavior"
13	BL	Effectiveness Study QAPP	16	Table 4.5 Tasks Required to Conduct Study	4th line under "Purpose"	Measure new adoption of targeted behaviors	Will revise to "Measure new adoption of targeted behaviors after E&O program has been implemented"
14	BL	Effectiveness Study QAPP	16	Table 4.5 Tasks Required to Conduct Study	Make clear that the "deliverables" are not deliverables to Ecology, unless they are	Deliverable between City and sub consultant	Will revise to "Deliverables" as a footnote "I" has been added to all Ecology/Permit Submittals.
15	BL	Effectiveness Study QAPP	16	Table 4.5 Tasks Required to Conduct Study	Annual Reports, Study Fact Sheet and Draft & Technical Report are required by permit language and should also carry the #1 superscript.	Annual Reports*, Study Fact Sheet*, Draft & Final Technical Report*, Submittals to Ecology. The QAPP submitted to Ecology meets the requirements of both the Detailed Study Design Proposal and QAPP for an Effectiveness Study. As such, the QAPP and not a proposal will be submitted to Ecology.	Superscript 1 added to annual report, Study Fact Sheet, and Draft & Final Technical Report
16	BL	Effectiveness Study QAPP	18	Table 4.5 Tasks Required to Conduct Study	Under superscript #1		A second superscript was added to separate QAPP/Proposal submittal definition from submittals to Ecology. Draft & Final QAPP has both 1 & 2 superscripts.
17	BL	Effectiveness Study QAPP	19	Table 4.6 Potential Constraints	Discern if unwilling or other reason, 3rd line under Mitigation Approach	Address barriers during implementation of the E&O Program.	Revised to "Identify barriers during implementation of the E&O program, which will be used to improve future E&O program implementation."
18	AJ	Effectiveness Study QAPP	22	5.2 Project Schedule	Not sure how to capture annual reporting following completion of the TER and Fact Sheet to meet SE.B.2.		Footnote to the Annual Report row: "Annual Report is submitted by City of Ellensburg and is not required to be a part of this study."
19	AJ	Effectiveness Study QAPP	24	6.0 Quality Objectives	2nd paragraph	The QAPP documents how the results obtained are of the type and quality needed and expected to support the intended outcomes of the study.	Will revise according to track changes.
20	BL	Effectiveness Study QAPP	29	7.1 Study Design	There is much duplication between Section 4.2 and 7.1 and 4.3 and 7.2. Usually the Overview section is shorter.		Have revised 4.2 and 7.1. Section 4.3 and 7.2 were significantly different in terms of content so no revisions were made to those sections.
21	AJ	Effectiveness Study QAPP	30	7.1 Study Design		The lead entity will send a City representative to these locations...	Revised terminology to be more consistent. "City representative" has been removed and replaced with just "lead entity". In each instance, Page 30 - last paragraph - sentence 2: The lead entity will also provide the filer via email. Survey has a space for Manager contact information where email and phone are clarified they should be recorded under.
22	BL	Effectiveness Study QAPP	30	7.1 Study Design	We recommend emailing the filer in addition to distributing a hard copy of the filer, as well as tracking receipt and posting of the filer.		

Comment Number	Commenter Initials	Document Reviewed	Page Number	Section Number or Title	Comment	Suggested Revision	OCI Response
23	BL	Effectiveness Study QAPP	32	7.2 Process for Selecting the Test Site and Target Population 8.2.1 Baseline Observation Site Visit	Good. to include the notation regarding high staff turnover		Noted, will retain text.
24	AJ	Effectiveness Study QAPP	36		2nd bullet under step 2, remove extra space in last sentence	...checklist and 1-2 photos...	Accepted deletion of extra space
25	BL	Effectiveness Study QAPP	45	11.0 Audits	Last bullet on page - This will be very important to do right away after the first couple of surveys, so see if something needs to change in the questions. It is sometimes tempting to skip questions in a long survey. Even for the person giving the survey.		Noted, final bullet revised to clarify that audit will be conducted following 2-3 in-person baseline survey visits.
26	AJ	Effectiveness Study QAPP	51	14.0 Reporting	There should be a place in the document that addresses unforeseen needs for study extension and that the City of Ellensburg will request an extension through a QAPP modification.		Added a footnote to Table 5.2 Proposed Study Timelines: "In the event that an unforeseen delay occurs, a QAPP modification will be submitted and SS requirements will take precedence over SS to meet permit deadlines."
27	AJ	New FDG Filer			Include City of Ellensburg official logo on filer. Filer should be accessible in multiple languages.		Will add City of Ellensburg logo on filer. Filer will be provided in English as 88% of Ellensburg residents speak only English (https://data.census.gov/tables//table704-ACSST5Y2019.S1601&_p=1 G00000US5321240). One of the study objectives will be to identify barriers to adoption of targeted behaviors; if language becomes a barrier, it will be summarized with recommendations for future E&O programs in the final report. A question will be added to the survey to discern whether language is a barrier to target behavior adoption. Pre & post E&O program survey results will act as a measurement of effectiveness. Selecting a subset of businesses for a control group is not necessary.
28		Effectiveness Study QAPP			The QAPP is missing a control group. Select a subset of businesses to be the control group.		Added "obtaining a copy of opening/closing duties" into sections 4.2, 7.1, 8.2.2 & 8.2.4.
29		Effectiveness Study QAPP			We recommend obtaining a copy of each business checklist or protocol for opening/closing business to cross-reference existing procedures for handling weeds.		

Appendix F: Corrective Action Plan Table

