City of Caldwell

Stormwater Management Program

Pollutant Reduction Activities

In accordance with NPDES Permit No. IDS-028118

Version 1.1 - April 9, 2021

Indian Creek at the 12th Avenue Outfall, Downtown Caldwell

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Introduction

This proposal is created in response to section *4.3: Pollutant Reduction Activities* of the City of Caldwell MS4 Permit IDS-028118, issued December 1, 2020.

The City of Caldwell's MS4 discharges to three designated impaired waters: the Boise River, Indian Creek, and Mason Creek. Section 4 of the City's MS4 Permit details special conditions required for discharges to impaired waters, requiring both quantitative monitoring and assessment of discharges and the implementation of at least two pollutant reduction activities. Table 1 identifies the impairing pollutants for each waterbody. The purpose of the following pollutant reduction activity proposal is to reduce the loading of selected pollutants from the discharges of the City MS4 into receiving waters.

Table 1. *Receiving Water Impairments (from page 33 of the City of Caldwell MS4 permit)*

Waterbody/Assessment Unit/Description	Impairment Pollutants
Indian Creek ID17050114SW002_04 *Indian Creek – Sugar Ave to Boise River*	Temperature; E. coli; Sedimentation/ Siltation; Cause unknown, nutrients suspected
Mason Creek ID17050114SW006_02 *Mason Creek – entire watershed*	Temperature; E. coli; Sedimentation / Siltation; Cause unknown, nutrients suspected; Malathion; Chlorpyrifos
Boise River ID17050114SW005_06b *Boise River – Middleton to Indian Creek*	Temperature; Fecal Coliform; Sedimentation / Siltation; Total Phosphorus

Sediment and bacteria have been the longest recognized pollutants causing impairments and requiring load allocations for the Lower Boise River subbasin, first detailed in the *1999 Lower Boise River TMDL*. The *Lower Boise River TMDL: 2015 Sediment and Bacteria Addendum* established TMDLs for additional water bodies within the Lower Boise River subbasin, including Indian Creek and Mason Creek. The TMDLs for the entire Mason Creek watershed and Indian Creek from Sugar Avenue to the Boise River – the segment which flows through the City of Caldwell – were established in that document for sediment and E. coli.

The City of Caldwell recognizes the importance of reducing sediment and bacteria loads to impaired receiving waters through the implementation of the City's Stormwater Management Program. Therefore, the City Public Works Department, Engineering Department, and Stormwater Program staff wish to present the following proposal for induction into the City's MS4 permit.

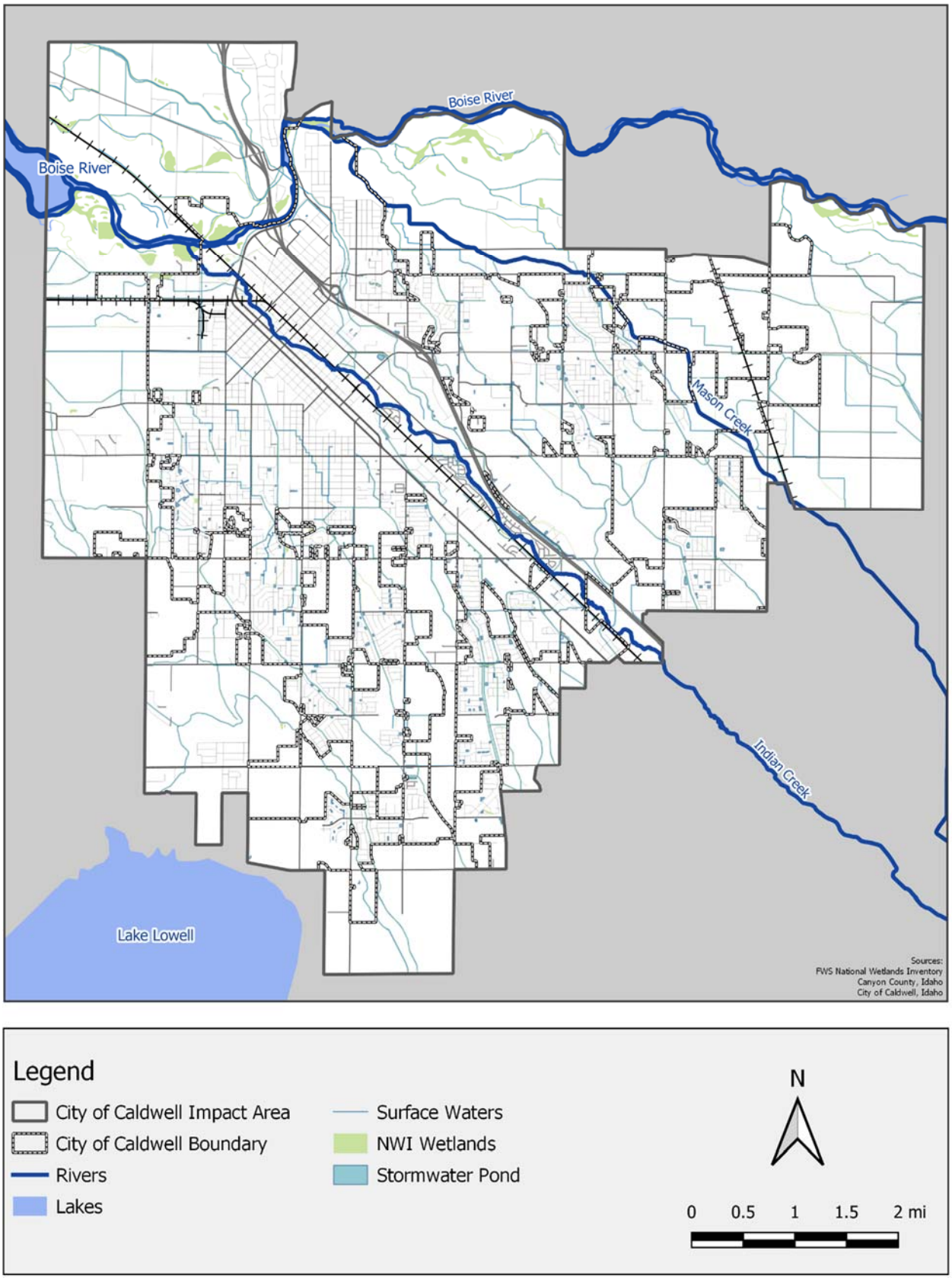

Figure 1. *Overview of the City of Caldwell and Surface Waters*

Activity 1. Expand Wash Rack to Improve Sediment Removal Program Efficiency

Project Overview

The City of Caldwell proposes to expand the existing vehicle washing and clean-out facility, informally known as the "wash rack" by adding at least one additional wash bay and a contained drying area. These additional features would increase the efficiency of the existing sand-and-grease trap and catch basin sump clean out programs, ultimately reducing sediment loading from the City's MS4.

Pollutant Impact and Assessment

Two mechanisms through which the City of Caldwell reduces sediment loading from its MS4 discharge are minimizing pollutants entering the MS4 and restricting pollutants from traveling freely through the system. The City of Caldwell's Street Department operates an extensive street sweeping program, to reduce the load of sediment entering the MS4. The MS4 system also includes best management practices (BMPs) including sumps and sand-and-grease traps to capture sediment and debris that has entered the MS4 system, and reduce the discharge of these pollutants into the impaired receiving waters. The Street Department maintains these structures regularly to ensure sufficient function, removing accumulated sediment and debris as needed.

By increasing the capacity of the wash rack by at least fifty percent and providing a designated location for drying sediment removed from municipal sumps, the existing bottleneck on the facility will be eased, allowing for greater efficiency for the City's heavy equipment and vacuum truck fleet. Reduced wait times at the wash rack will increase the amount of time operators are able to spend actively removing sediment from roadways and sumps.

The City proposes to track the effectiveness of this pollutant reduction activity in three ways:

1. Utilizing monitoring equipment on City vehicles and geofences around the wash rack site to determine the average daily number of vehicle stops at the wash rack, as well as the average duration of time spent at the site. This data will be assessed to quantify the increase in the number of vehicle cleanouts, from which an estimated increase in sediment volume removed can be inferred. Additionally, the data will be used to determine an impact (if any) to the average amount of time spent at the site, as a measure of overall program efficiency through reducing wait times.
2. Directly tracking miles of roadways swept and the number of sumps, siphons, and sand-and-grease traps cleaned. Pre-project and post project values will be compared to quantify the percent increase of maintenance activities on a monthly and annual basis.

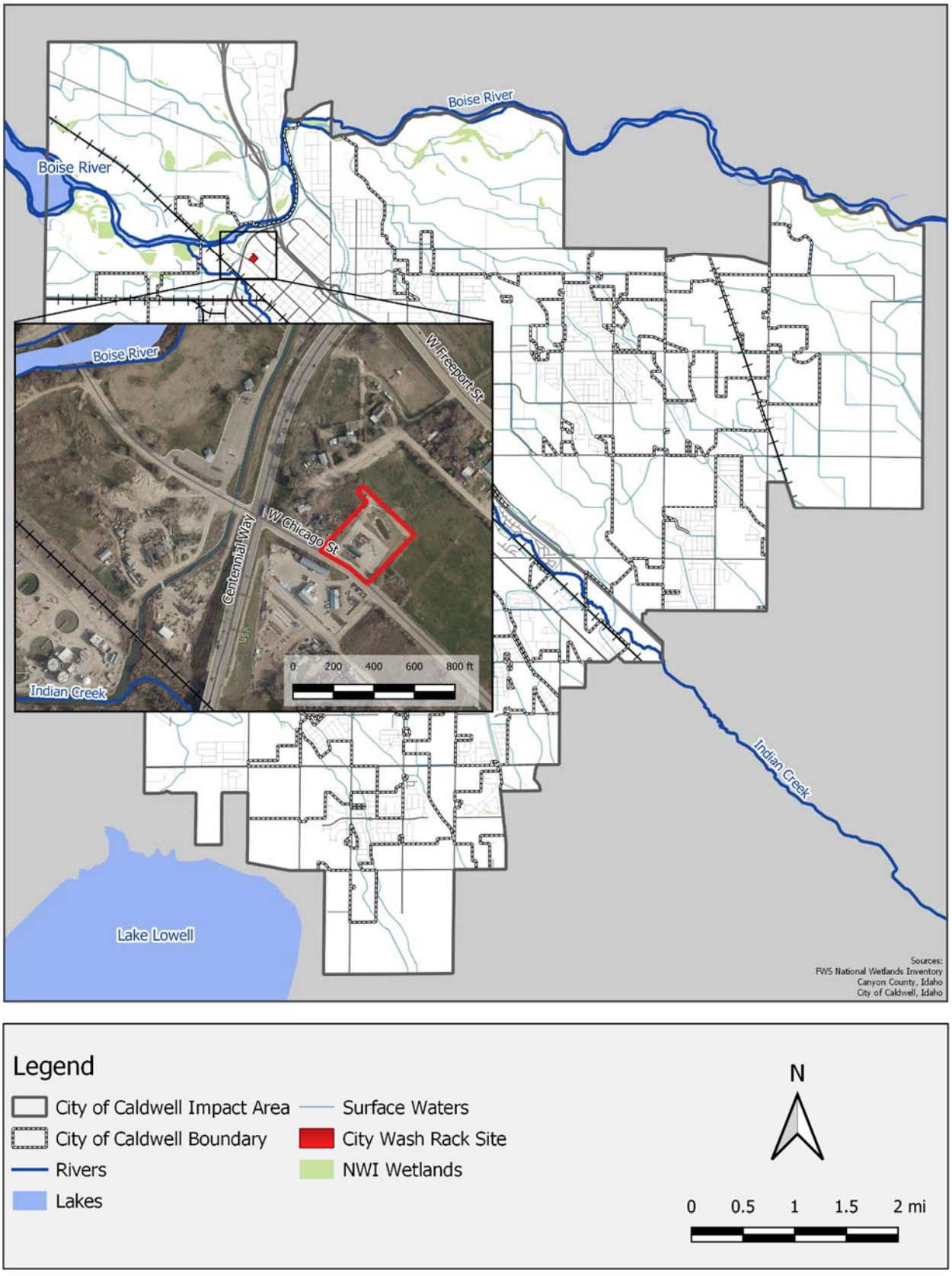

Figure 2. *Wash Rack Site Location*

3. Comparing water quality data from the monitoring program, evaluating Total Suspended Solids (TSS) load in milligrams per liter, from before and after project implementation.

Data collected using the monitoring equipment – site visit frequency and duration, miles of roadways swept, and number of sumps, siphons, and sand-and-grease traps cleaned – will be compiled into monthly reports. Intensity of maintenance operations is seasonally dependent, therefore breaking the data up into monthly segments will allow for the most accurate assessment of program efficiency. An annual report will also be completed, detailing the status of the project and providing an analysis of collected data, both the monthly report data and the annual MS4 pollutant monitoring data. This report will be included as an appendix to the City's annual MS4 report.

Existing historical records of sediment removal from the City's MS4 indicate an estimated 800 cubic feet of sediment are annually removed from the system, assuming that sediment makes up fifty percent, by volume, of the material removed from the storm drains, given that the sediment in the storm drains are generally fully saturated with stormwater. By increasing the capacity of the City's wash rack by fifty percent, the City estimates an additional 400 cubic feet of sediment will be removed annually. The annual reports compiled for this project will document the City's effectuality in reaching this goal.

Project Narrative

The City of Caldwell owns a vehicle washing and clean-out facility, informally known as the "wash rack," that is maintained and managed by the Street Department. The wash rack is located at 308 W. Chicago Street, which is near the intersection of W. Chicago Street and Centennial Way in Caldwell, Idaho, as shown in

Figure **2**.

This site houses one enclosed vehicle-washing tent and two outdoor wash bays. Every stall is plumbed to drain to the City sewer. The enclosed tent is large enough to serve one large vehicle or piece of equipment at a time. The two outdoor wash bays are each large enough to serve two vehicles at a time. The wash rack is available for all City departments to use, though it is most frequently utilized by the Street and Water departments, and it is used for sweepers, vacuum trucks, other heavy equipment, fire engines, and fleet equipment.

The sweeper and vacuum trucks, as well as the heavy equipment, are generally washed out at the two outdoor wash bays. As a result, these ramps see a larger load of sediment when compared to the wash tent. These bays frequently hold standing water and large sediment deposits, requiring regular dredging to continue operating. During peak maintenance seasons, the bays are dredged out monthly; during slower maintenance season, the bays are dredged quarterly. At this time, there is not a designated place for the dredged materials to be placed to dry sufficiently to be transported for disposal, so the materials are placed to dry in small piles on the flat area just north of the bays.

As all of the wash bays are connected to the City sewer, the stormwater management facility onsite predominantly receives stormwater runoff from asphalt paved areas, combined with a small amount of overspray of clean water that inadvertently sprays past the vehicles during pressure washing. Due to the nature of activities on site, the runoff management system is a stormwater retention system, and is not designed to discharge following a typical storm event. The onsite stormwater management consists of one main stormwater retention swale, connected to the paved areas of the site by a conveyance swale to the northwest of the wash bays and a storm drain line, with an inlet in the center of the paved area. The stormwater retention swale may intercept a high or perched groundwater table; it has held water since soon after it was installed, but it does not overflow or discharge.

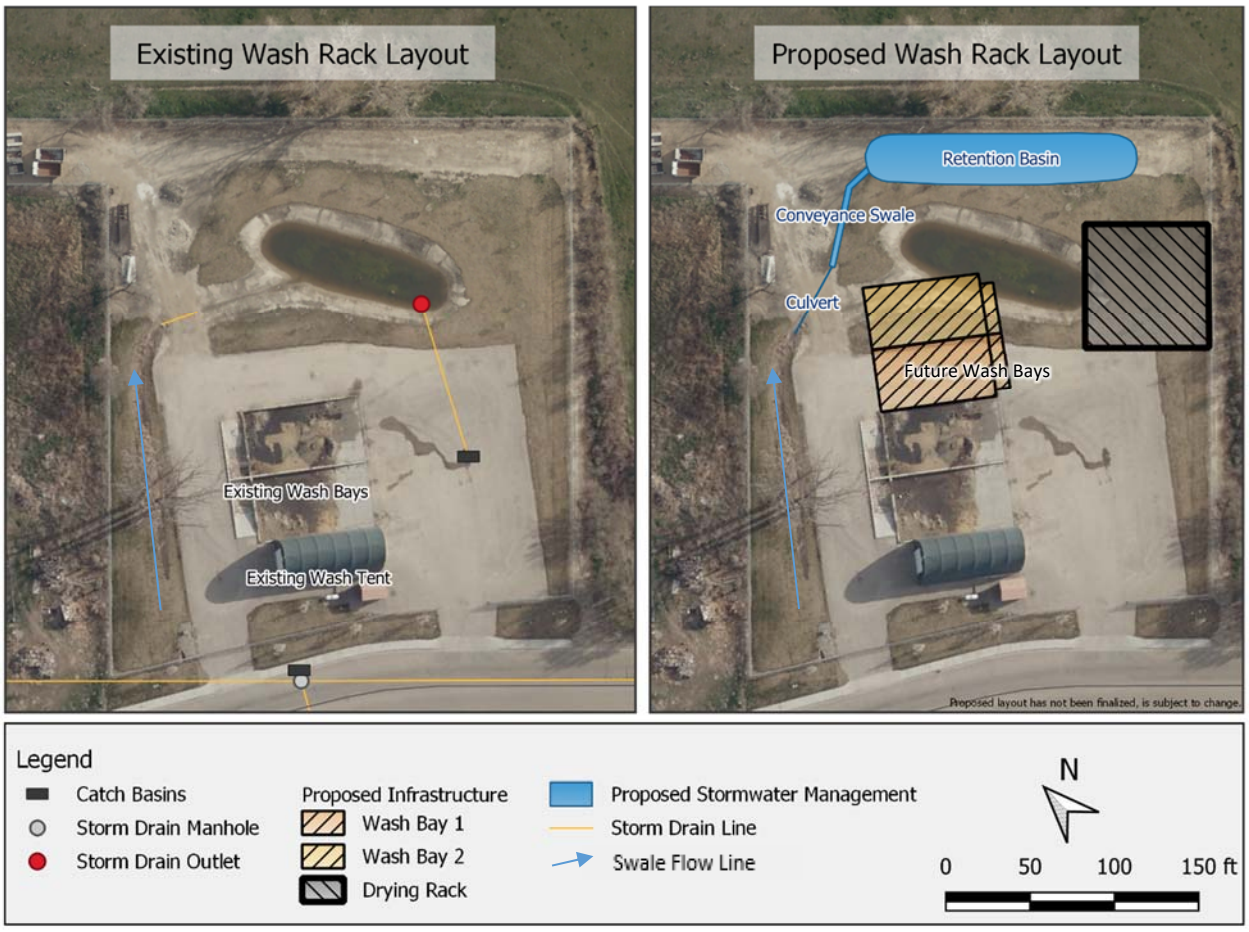

Figure 3. *Existing and Proposed Wash Rack Layouts*

With the rapid urbanization and expansion the City of Caldwell has experienced in the past decades, coupled with the need to meet the requirements of the City's MS4 permit, there is an increasingly high demand for the City's Street Department to sweep roadways and maintain stormwater management infrastructure. At this time, the wash rack is unable to keep up with the demands of the City departments, and this strain will continue to become exacerbated as the City grows. The current constraints limit the number of equipment and

vacuum trucks able to utilize the facility, reducing the efficiency of these sediment and pollutant capturing programs.

This proposed program seeks a minimum of a fifty percent increase of the capacity of the outdoor wash bays by constructing at least one additional wash bay, as shown in Figure 3. This will alleviate the strain on the existing bays, and allow for more available wash-out locations during peak traffic periods at the wash rack. As with the existing wash bays, the new bays would be plumbed into the City sewer.

The other concern identified with the existing wash rack layout is the lack of an area in which to contain solids dredged from the wash bays as they dry. The City's municipal sump storage has historically been dried at the wash rack, and then combined with street sweepings in a stockpile for later use. After being screened, the comingled material can be used as backfill for municipal development projects, aggregate in concrete/asphalt, roadway shoulder repair, or subgrade fill. This project would install a designated, contained location for drying solids, with a drain to the City sewer. In order to expand the wash rack facilities, it will be necessary to relocate the existing stormwater retention swale. The final location of the stormwater retention basin will be determined following a survey of the site and an assessment of the site's topography and hydrogeology.

By expanding the capacity of this critical facility, the City seeks to increase the efficiency of the street sweeping program and the storm drain sump, siphon, and sand-and-grease trap clean out programs, ultimately reducing the potential for sediment to discharge from the City's MS4 system.

Project Timeline

As detailed in the City of Caldwell's MS4 permit, two pollutant reduction activities must be implemented by the end of the five-year permit term, April 3, 2025. To ensure the proposed activities are completed in the designated time frame, the following timeline has been prepared to guide the implementation process. The final timeline may vary slightly, due to unforeseen circumstances and constraints, however the project should generally be implemented as follows:

2021

- Develop project proposal
- Implement monitoring program to collect pre-project implementation data
- Produce monthly data reports
  - Number of trips to the wash rack
  - Time spent at the wash rack
  - Number of sumps, siphons, and sand-and grease-traps cleaned
- Produce annual report summarizing monthly reports and annual monitoring program data

2022

- Develop site plan, create construction plan set
- Develop stormwater management plans for stormwater retention basin and necessary connecting infrastructure
- Select construction crew
- Produce monthly data reports
    - Number of trips to the wash rack
    - Time spent at the wash rack
    - Number of sumps, siphons, and sand-and-grease traps cleaned
- Produce annual report summarizing monthly reports and annual monitoring program data

2023

- Construct new infrastructure and stormwater management facilities
- Produce monthly data reports
    - Number of trips to the wash rack
    - Time spent at the wash rack
    - Number of sumps, siphons, and sand-and-grease traps cleaned
- Produce annual report summarizing monthly reports and annual monitoring program data

2024

- Produce monthly data reports
    - Number of trips to the wash rack
    - Time spent at the wash rack
    - Number of sumps, siphons, and sand-and-grease traps cleaned
- Produce annual report summarizing monthly reports and annual monitoring program data

2025

- Produce final report on project, including assessment of project effectiveness

Project status will be documented in the annual report, and any modifications to the timeline will be documented as necessary.

Figure 4. *Wash Rack Outdoor Wash Bays*

Activity 2. Microbial Source Tracking Study Phase 2: Identify and Remove Intermittent E.coli Bacteria

Project Overview

The City of Caldwell proposes to implement the second phase of an ongoing study which aims to identify the origin of human-source bacteria, for the purpose of developing a plan to eliminate or mitigate, the source of the pollutant.

Pollutant Impact and Assessment

Since 2009, MS4 monitoring at the 12th Avenue outfall to Indian Creek has identified seasonally elevated E.coli levels discharging into Indian Creek. As both Indian Creek and the Boise River are impaired for E.coli, the City of Caldwell recognizes the importance of identifying the source of this pollutant and eliminating or mitigating the source to the maximum extent practicable.

The City of Caldwell has partnered with the EPA to conduct a microbial source tracking study, to identify the origin of the fecal contamination. The first phase of the study was intended to identify the classification of the bacteria's original host. Historical MS4 monitoring has evaluated the load of E.coli and bacteroides classification in the discharge, but has not provided insight into the source. The E.coli could be from a range of sources, including but not limited to water fowl, domesticated animals, livestock, or humans. Phase 1 of the study's laboratory results demonstrated repeated human fecal detection at the 12th Avenue outfall. Curiously, the pattern of fecal hits coincide with the local irrigation season, generally from April to October, annually. Overall E.coli drop off sharply during the winter months.

Phase 2 seeks to close in on the source of the fecal contamination within the 12th Avenue storm-watershed. This study phase will collect samples from four sites, each representing a sub-storm-watershed within the drainage area. Both the presence and/or absence of human fecal sources (reported as copies/100mL) will provide useful insight to narrow down the location of the fecal coliform bacteria.

Water samples will be sent to the EPA Region 10 Laboratory for assessment. Lab results will be stored until the project sampling is completed, at which time the City of Caldwell will produce a final report on the study, analyzing the data and drawing conclusions regarding the source of the pollutant.

The results of the study will determine the next course of action taken by the City to address the source of the E.coli. If the study identifies the source, the City will develop a plan to eliminate or mitigate the pollutant source; the effectiveness of that action would be evaluated by comparing previous monitoring data to the ongoing data collected through the

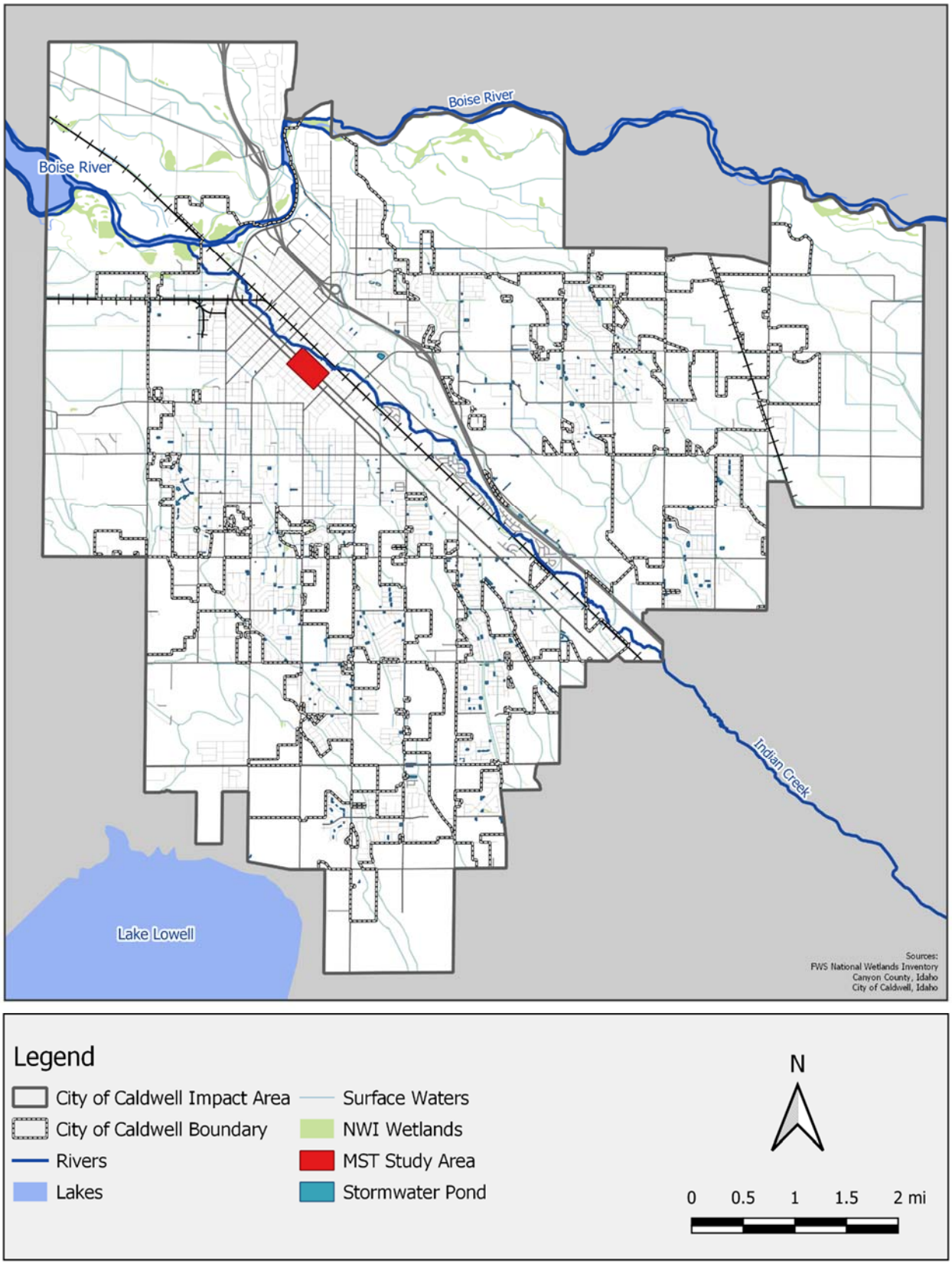

***Figure 5**. Microbial Source Tracking (MST) Study Location*

City's MS4 monitoring program. If the microbial source tracking is not able to definitively identify the source, the City will develop a plan to implement further investigations to determine the source.

Project Narrative

Like the rest of the Treasure Valley, the City of Caldwell is experiencing a steady, rapid state of growth. As the City limits expand to accommodate the influx of people and development, the new developments become subject to the jurisdiction of the City. In meeting the requirements of the City's MS4 program, all new developments within City limits are required to install onsite stormwater retention facilities to contain designated stormwater events. These BMPs are intended to reduce the impact of new development on the watershed and reduce pollutant loading into the City's MS4 system. In contrast, the downtown and historic corridors of the City were constructed prior to the implementation of stormwater quality regulations. These areas operate using antiquated stormwater conveyance infrastructure and may discharge with minimal upstream retention or undersized treatment mechanisms.

One such location is 12th Avenue, which collects stormwater runoff from Dearborn Street, Cleveland Boulevard, Blaine Street, and Arthur Street, from 20th Avenue down to 12th Avenue. With the exception of Arthur Street, all of this tributary area falls into Caldwell's Steunenberg Residential Historic District. In the abovementioned drainage area, 12th Avenue acts as the manifold, collecting water from each of these streets, then flowing northeasterly toward Indian Creek, this area is shown in red in Figure 5. In this area of the City, the drainage infrastructure is approximated to be as old as the era of the homes—circa 1900. The drainage method between catch basins includes siphon lines, instead of gravity lines. The use of siphons may have minimized the quantity of construction materials and excavation at the time of development, but can cause unintended impacts to the quality of the water left in the system after the storm event ends.

The outfall to Indian Creek at 12th Avenue has historically exhibited seasonally elevated levels of E.coli. Because of this recurrence, a Boise EPA staff member offered the City access to EPA's microbial source lab services as an option of studying the source of the elevated E.coli. Phase 1 of the study examined the content of stormwater samples at 10th Avenue and 12th Avenue. Phase 2 of the study examines stormwater from each of the streets tributary to 12th Avenue, as well as the 12th Avenue outfall to Indian Creek, each of the four sample sites represents a contributing sub-storm-watershed, as shown in Figure 6. Through the collection and analysis of water samples at each of these sites, the City intends to narrow down the sub-storm-watershed in which the human-derived fecal coliform bacteria originates. Positive hits and variations in concentration serve as indicators of likely source locations.

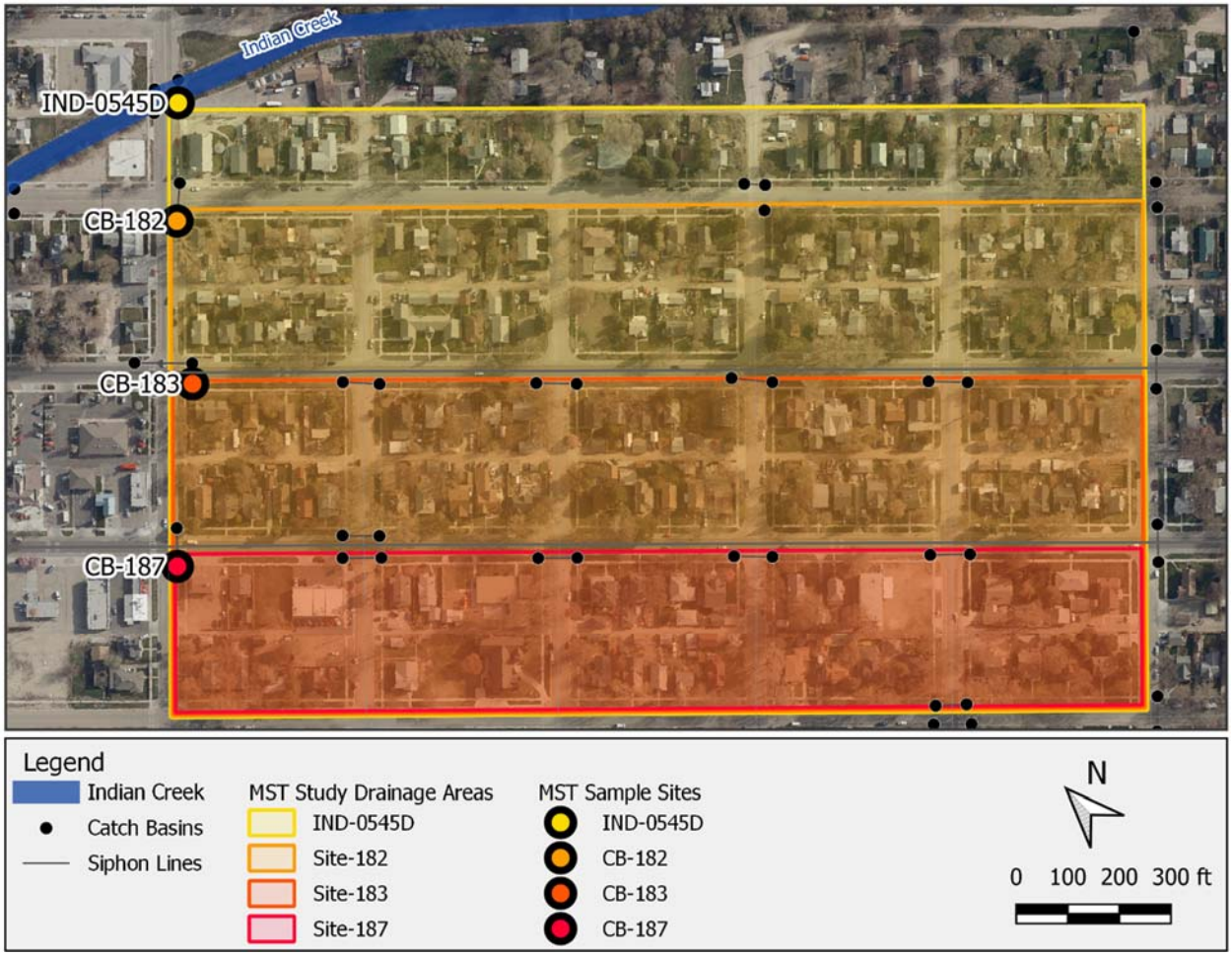

***Figure 6**. Microbial Source Tracking (MST) Study Sample Sites and Drainage Areas*

Once sample collection by the City and lab analysis by the EPA have concluded, the City will begin to analyze the results of the data to determine if a source of the bacteria pollution can be established. If the results are significantly conclusive, the City will draft a plan of action for eliminating the bacteria source. If the results of Phase 2 of the study are inconclusive, the City will develop a plan to conduct additional investigation into the source of the bacteria; such a plan might include sub-storm-watershed E.coli sampling, dye tests, smoke tests, and/or CCTV of the storm drain lines. Ultimately, if the City is unable to determine the source of the bacteria or the source is determined to be infeasible to effectively eliminate or reduce, the City will explore options to install additional BMPs to attenuate E.coli in the system before it discharges to Indian Creek.

Project Timeline

Phase 2 of the Microbial Source Tracking Study was approved in October of 2019, with a proposed project timeline concluding in early 2021. Due to the unforeseen impacts of the SARS-CoV-2 pandemic, the sample collections for this project were significantly impacted, delaying the study. Three of the necessary six samples have been collected; the collection of the final samples and the analysis and application of the results will follow the timeline

shown in Table 2. The final timeline may vary slightly, due to unforeseen circumstances and constraints, however the project should generally be implemented as follows:

Table 2. *Microbial Source Tracking Study Project Timeline*

	Jan – Jun 2021	Jul – Dec 2021	Jan – Jun 2022	Jul – Dec 2022	Jan – Jun 2023	Jul – Dec 2023	Jan – Jun 2024	Jul – Dec 2024	Jan – Mar 2025
Collection of samples	X	X	X						
EPA processing lab results				X					
City analysis of results					X				
Develop Action Plan to eliminate source **OR** Further Investigation Plan						X			
Determine feasibility of Action Plan and implement **OR** conduct further investigation							X	X	
Final Report Quantifying Accomplishments									X

Project status will be documented in the MS4 annual report, and any modifications to the timeline will be documented as necessary.

Figure 7. *12th Avenue Outfall to Indian Creek*