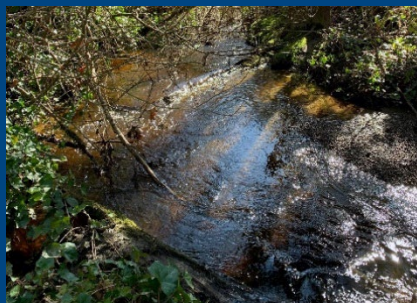
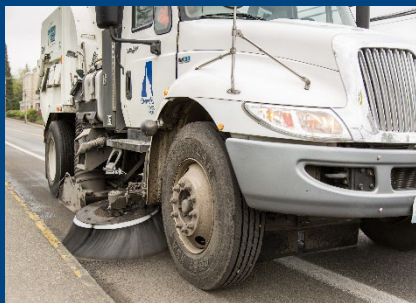


City of Olympia **Stormwater Management Action Plan**



Prepared by the City of Olympia Stormwater Utility

March 30, 2023



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Abbreviations

B-IBI	Benthic Index of Biotic Integrity
BMPs	Best Management Practices
DDECM	Drainage Design & Erosion Control Manual
DO	Dissolved Oxygen
Ecology	Washington State Department of Ecology
GSI	Green Stormwater Infrastructure
HOA	Homeowner's Association
IDDE	Illicit Discharge Detection & Elimination
LID	Low Impact Development
NPDES	National Pollutant Discharge Elimination System
REEP	Regional Environmental Education Partnership
SMAP	Stormwater Management Action Plan
TMDL	Total Maximum Daily Load
UGA	Urban Growth Area
WSDOT	Washington State Department of Transportation
WWHM2012	Western Washington Hydrology Model

Summary

The City of Olympia's Storm & Surface Water Utility operates a municipal separate storm sewer system under the regulatory framework of the National Pollutant Discharge Elimination System (NPDES) Western Washington Phase II Stormwater Permit (Permit), administered by the WA State Department of Ecology. The utility is managed based on actions required by the Permit, alignment with Olympia's Comprehensive Plan, and a 10-year Storm and Surface Water Plan that was adopted by the Olympia City Council in 2018. In collaboration across all City departments and with support to the local community, successful implementation of the Storm and Surface Water Plan and compliance with the NPDES Phase II permit will reduce flooding, protect water quality and aquatic habitat from harmful pollutants, improve public health, increase resilience to climate-related hazards, and address historic environmental inequities (City of Olympia, 2018).

Section S5.C.6.d of the current 2019-2024 NPDES Stormwater Permit requires all Phase II permittees to undergo a planning process to develop a Stormwater Management Action Plan (SMAP) for a stream basin with a high level of stormwater influence. The purpose of the SMAP is to address two driving questions:

1. "How (and where) can we most strategically address existing stormwater problems?
2. How can we meet our future population and density targets while protecting and improving conditions in receiving waters?" (WA Ecology, 2019).

A comprehensive, city-wide Receiving Waters Assessment was followed by a Basin Prioritization process to identify a stream basin (or smaller catchment area within a basin) with the most promising combination of needs and opportunities to improve water quality and aquatic habitat conditions. The City of Olympia selected Indian Creek Basin to move forward with a Stormwater Management Action Plan based on this analysis. Indian Creek is in the upper Moxlie Creek watershed, converging with the main stem of Moxlie Creek near the intersection of Plum St SE & Union Ave SE in downtown Olympia. From there the stream is piped approximately 1 mile to an outfall to East Bay of Budd Inlet. 77% of the basin is contained within the city limits of Olympia with the headwaters in the Olympia Urban Growth Area (UGA) of Thurston County. The basin covers a variety of different land use types, from riparian forest and wetlands to commercial zones primed for redevelopment over the next 20 years. The City has identified opportunities specific to Indian Creek Basin to benefit over-burdened communities by investing in stormwater management activities that promote co-benefits, such as improving right of way conditions for cycling and pedestrians, providing resources and support to small business owners, reducing flooding, and increasing urban livability.

Watershed Inventory & Receiving Waters Assessment

Existing data were used to update the Olympia Stream Basin Analysis originally conducted in 2011, last reviewed in 2018 as part of the current Storm & Surface Water Plan. The resulting Watershed Inventory (Table 1: Summary of Basin Characteristics) includes an updated delineation of Olympia's sixteen watersheds (Figure 1: Basin Map) and an assessment of stormwater Influence for each. Following guidance provided by the Department of Ecology in section S5.C.6.d of the Permit, existing conditions for each basin are described by geography, land use, land cover, transportation, stormwater infrastructure, aquatic wildlife habitat, and recreational uses. Recommendations regarding which data to consider were also provided by City staff from other departments, the City's Utility Advisory Committee, as well as local stakeholder groups. Specific datasets that were analyzed during the Receiving Waters Assessment are described further in Table 2: Receiving Waters Assessment Indicators

& Ranking. Results of the assessment provide a snapshot into the environmental health and designated uses of each watershed, as well as current and future development pressures anticipated over time.

Basin Prioritization

Data from the Receiving Waters Assessment were utilized in the prioritization process to select a basin for a SMAP. Following guidance from *Building Cities in the Rain: Watershed Prioritization for Stormwater Retrofits* (WA Dept. of Commerce, 2016), each dataset represents an indicator in the prioritization matrix. A collaborative ranking process incorporated input across Olympia's Storm & Surface Water Staff to assign a weight to each indicator. Additional factors were considered along with the results of the analysis and prioritization of receiving waters data, such as opportunities to benefit over-burdened communities and location and type of City-owned properties to maximize treatment options. While multiple basins would have benefited from additional stormwater management action planning for different reasons, Indian Creek basin was selected after ranking highest in the prioritization and offering the greatest combination of needs and opportunities for receiving waters improvements.

Stormwater Management Action Plan

The Stormwater Management Action Plan for Indian Creek Basin includes five structural stormwater retrofit facilities for catchment areas with the greatest need for treatment based on arterial and collector street sections of untreated roadway and other untreated impervious surfaces. These capital projects range from biofiltration systems incorporating green stormwater infrastructure (GSI) to underground vaults with cartridge filters, depending on landscape conditions. These conceptual treatment facilities have the potential to bring these roadway sections into compliance with the current Olympia Drainage Design and Erosion Control Manual requirements for treatment and flow control.

In addition to infrastructure retrofits, the following stormwater management activities are included in the Action Plan with enhanced or prioritized actions described for Indian Creek basin:

- Land Use Management & Policy
- Habitat Restoration & Conservation
- Community Outreach & Engagement
- Source Control Inspections, Technical Assistance and Enforcement
- Maintenance & Operations
 - Illicit Discharge Detection & Elimination (IDDE)
 - Street Sweeping
 - Conveyance Infrastructure Monitoring & Maintenance

Land Acknowledgement

The City of Olympia honors and acknowledges the Indigenous people who have stewarded this land since time immemorial, and who continue to live on and care for it today: the Steh-Chass Band of Indigenous people of the Squaxin Island Tribe.

Receiving Waters Assessment

Table 1: Summary of Basin Characteristics

Basin	Total Basin Area	Subbasin Size (Acres within City)	% in Olympia	Impervious (Acres)	% Impervious	% UNTREATED Pollution-Generating Impervious	Equity Index Level of Burden	Receiving Waters	Drift (For direct discharge to Puget Sound)	Stormwater Mgmt Influence (High, Medium, Low)
Budd Inlet - East Bay & Peninsula	488	488	100%	256	52%	86%	Med	Budd Inlet	Left to Right	High
Budd Inlet - West Bay	1540	485	31%	195	40%	83%	Med	Budd Inlet	No Appreciable Drift (High Sediment)	High
Chambers	6856	814	12%	69	8%	64%	Med	Deschutes > Capitol Lake > West Bay > Budd Inlet	N/A	Med
Deschutes	8938	45	0.51%	10	22%	97%	High	Capitol Lake > West Bay > Budd Inlet	N/A	Low
Eld	3405	6	0.2%	2	26%	.1%	Med	Eld Inlet	Right to Left	Low
Ellis	1296	264	20%	28	11%	84%	Low	Budd Inlet	Right to Left	Low
Green Cove	2542	1031	41%	179	17%	51%	Low	Eld Inlet	Right to Left	Med
Indian	1421	1089	77%	381	35%	67%	High	Moxlie Creek > East Bay > Budd Inlet	No Appreciable Drift (High Sediment)	High
Kettles	1355	868	64%	259	30%	59%	Med	Infiltration	N/A	N/A
Mission	408	384	94%	96	25%	79%	Low	Budd Inlet	Right to Left	High
Moxlie	1006	1006	100%	446	44%	80%	High	East Bay > Budd Inlet	No Appreciable Drift (High Sediment)	Med
Percival	10290	1758	17%	791	45%	25%	Med	Capitol Lake > West Bay > Budd Inlet	No Appreciable Drift (High Sediment)	Med
Schneider	589	582	99%	211	36%	33%	Med	Budd Inlet	Right to left	Med
Woodard	4856	1496	31%	566	38%	40%	High	Henderson Inlet	No Appreciable Drift (High Sediment)	High
Woodbury	317	245	77%	76	31%	2%	Med	Infiltration	N/A	Low
Woodland	19466	347	2%	142	41%	42%	High	Henderson Inlet	No Appreciable Drift (High Sediment)	Low

Basin Descriptions

East Bay & Port Peninsula

Portions of Budd Inlet do not meet water quality standards for DO due to altered circulation patterns from the 5th avenue dam and anthropogenic sources of nutrients both locally and outside of Budd Inlet. A combination of dense residential, industrial, and recreational land uses contribute to the basin's water quality issues. Much of the development in this basin predates stormwater management BMPs with need for water quality treatment. The Port of Olympia has several outfalls and treatment facilities intended to improve conditions lower Budd Inlet. The city has identified few feasible opportunities for retrofits or other stormwater management actions in this area. Developed shorelines and outfalls to Budd Inlet have resulted in marginal aquatic habitat value or other designated uses.

West Bay

The basin includes Garfield Creek and several seasonal streams discharging directly to West Bay via piped outfalls. Land use is urban residential and professional offices. Urban residential, commercial, recreational, and industrial uses contribute to the West Bay Basin's water quality issues. None of the small streams along West Bay that discharge directly into Budd Inlet are monitored. Historic development in the basin has impacted the small streams in this area. The 2016 West Bay Environmental Restoration Assessment identified several stormwater retrofit opportunities of which one has been constructed and others are in design (City of Olympia, 2016).

Chambers

Chambers Ditch flows south through the northern Chambers basin for approximately 2.5 miles, draining into the Deschutes River south of Hewitt Lake. The basin's hydrology and water quality are heavily influenced by surrounding agricultural land uses, high ground water levels, and prairies with several kettles that contain groundwater-fed lakes with no natural inlets or outlets. Water quality concerns include temperature, high nitrate and total phosphorus concentrations, likely due to impacted groundwater. The basin is almost exclusively zoned residential with increasing development density potential. Only 12% of the basin falls within the City of Olympia, the basin extends into the Urban Growth Area with potential for future land-use actions that may impact receiving waters. The City of Olympia's Habitat Stewardship Program has an ongoing habitat restoration project to enhance wetland habitat surrounding Chambers Lake.

Deschutes

The Deschutes River flows over 57 miles from its headwaters southeast of the City of Rainier to Capitol Lake then into Budd Inlet at West Bay. Parts of the Deschutes River are on Ecology's 303 (d) list of impaired water bodies due to violations for temperature, fecal coliform bacteria, DO, pH, and fine sediment levels. Growth and rural land uses contribute to non-point pollution sources. Summer low-flow causes high temperatures. Within the city limits, most of the runoff is captured in kettles connected to the river only by groundwater. The Deschutes is a priority for actions to promote salmon recovery however less than 1% of the basin falls within Olympia's city limits.

Eld

The Eld Inlet Basin is located at the western edge of the city limits and extends up the Cooper Point and Steamboat Peninsulas to the mouth of the inlet. The basin is approximately 23,000 acres, however only 6 acres of the basin are located within the city limits. **Woodbury** is a catchment area adjacent to Eld, stormwater runoff from this area within is captured in private treatment facilities and a closed depression on the south side of the 4800 block of Harrison Avenue. The closed depression only discharges to Eld Inlet via groundwater. Land use in the basin is forest, agriculture and rural residential.

Ellis

The Ellis Creek basin consists primarily of rolling hills and wetlands. The creek starts at Setchfield Lake at an elevation of 170 feet, gradually slopes east to west and discharges to Budd Inlet. Portions of the creek are within a steep ravine with the last reach flowing through intact native forest in Squaxin Park (formerly Priest Point Park) into Ellis Cove. Land use is primarily rural and suburban residential; Erosion from high stream flows and nonpoint source pollution pose additional water quality concerns. The creek does support populations of native fish including salmon. Partial fish passage barriers exist at East Bay Drive, Gull Harbor Road and 36th Ave NE. 80% of the basin lies outside city limits with limited opportunity for City-initiated stormwater management actions.

Green Cove

The headwaters of Green Cove Creek lie within Olympia's city limits, including the 195-acre Grass Lake Nature Park owned and managed by the City of Olympia Parks Department. The creek collects water from several large wetland complexes including at Grass Lake Nature Park before it empties into Eld Inlet at Green Cove, outside of Olympia's jurisdictional boundary. Habitat stewardship of the wetland buffer and surrounding riparian areas has been ongoing since the late 1990's and most of the natural area supports a wide range of wildlife with diverse native vegetation composition. The creek is one of the healthiest in the city supporting several native salmon populations and Olympic mudminnow, a

Washington State Sensitive Species. Green Cove Basin is a sensitive drainage basin that benefits from impervious surface limits required in the residential low impact development zoning. While some residential development is allowed in a designated Land Use District, it must be configured in a way that avoids impacts on stormwater management and aquatic habitat. (City of Olympia Municipal Code, 2022). Water quality standards are generally met. Nutrient concentrations occasionally rise above the regional reference conditions. The water quality and flood attenuation functions provided by the large wetland complexes in the upper basin provide significant benefits for the downstream receiving waters.

Indian

Indian Creek is 3.5 miles long beginning at Bigelow Lake in the Urban Growth Area northeast of Olympia city limits. The creek merges with Moxlie Creek at Plum Street and Union Avenue near downtown Olympia. It enters Budd Inlet at East Bay via a 1-mile piped section of Moxlie Creek. Several wetlands border Indian Creek throughout the basin with many spring-fed channels in the lower reaches along the Karen Fraser Olympia Woodland Trail. Some sections of the main channel along the Trail were substantially altered by construction of the railroad right of way. The City-owned portion of the basin consists primarily of native forest cover buffering the creek and receives runoff from nearby residential neighborhoods and portions of Interstate 5. Homeless encampments along the creek are likely impacting water quality. Land use in more heavily developed areas of the basin consist of moderate urban to high density residential and commercial zoning with future infill and redevelopment proposed. Historic development, runoff from I-5 and several major arterial roadways impact water quality and flows. The Moxlie pipe and culverts under Interstate 5, Boulevard Road and Pacific Ave impact fish passage, however water quality and flow control interventions in Indian Basin are anticipated to have positive impacts on fish habitat at Budd Inlet.

Kettles

Several dozen kettles ranging in size from less than one acre to over 5 acres are located in southeast Olympia, dispersed throughout what is otherwise the upper Moxlie Creek basin. These large depressions were formed by retreating glaciers and while they capture surface runoff from surrounding neighborhoods, they have no surface outflows to receiving waters. Infiltration from these ponds may eventually enter neighboring basins via groundwater flows, affecting hydrology but having limited impact to surface water quality. For the purposes of assessing stormwater influence and treatment options, these geographic features were not included in the receiving waters assessment or basin prioritization for SMAP. Ward Lake is the largest of the kettles, and lies on the basin boundary between Moxlie, Deschutes, and Chambers.

Mission

Mission Creek is 2.1 miles long and originates in the wetlands just south of Mission Creek Nature Park and flows through a relatively flat basin. The headwaters wetland complex becomes a defined channel as it flows northwest through single-family residential neighborhoods in a deep ravine to the south end of Squaxin Park. The creek enters Budd Inlet at the site of a 2013 estuary restoration project. Several culverts along the creek are full or partial fish passage barriers. Land use includes residential, public schools, public parks, and natural areas. Historic pre-stormwater regulation development negatively impacts Mission Creek Basin. The basin is majority residential with limited city-owned infrastructure leaving limited city jurisdiction for flow control and treatment retrofits or other stormwater management actions outside of habitat stewardship support.

Moxlie

Moxlie creek is approximately 2.1 miles long and is piped underground approximately 0.8 miles through downtown Olympia. Several small springs and tributaries enter Moxlie Creek throughout Watershed Park. Indian Creek flows into Moxlie Creek at Plum Street between Union Avenue and Henderson Boulevard. The creek enters a culvert at Union Avenue and is piped all the way to its discharge point into Budd Inlet at the southern end of East Bay. This culvert and the culvert under Interstate 5 are partial fish passage barriers. Fecal coliform pollution has been a chronic problem since the execution of water quality monitoring in the 1990s, some of which likely originates in Indian Creek. Nitrate and total phosphorus concentrations are above the regional reference condition. Stormwater discharges continue to alter the natural creek channel in the Moxlie watershed and degrade water quality throughout the length of the creek. Primary land uses include urban commercial and urban residential, heavily forested public parks, and suburban residential.

Percival

Percival Creek is 4.1 miles starting at the north end of Trosper Lake in Tumwater and discharging to Capitol Lake. Ken Lake and Black Lake are tributaries to Percival Creek via human-made ditches. Several small tributaries, springs, and seeps enter the creek along its route to Capitol Lake. The Yauger Park and Black Lake Meadows Stormwater Facilities treat 75% of pollution-generating surfaces and function to minimize flooding in the area; this is the largest percentage treated of any basin area within city limits. Subarea planning in the Capital Mall area is currently underway, presenting both opportunity for updated low impact development and green infrastructure investments while simultaneously increasing development-related pressures to consider. Percival Creek is fish bearing, often having runs of Chinook and Coho salmon when the fish gates are opened at Capitol Lake. Percival Creek and Black Lake Ditch are on the 303(d) list of impaired water bodies. Both experience problems with low DO levels and high temperatures potentially related to conditions in Black Lake. Percival Basin's rapid growth is increasing the impact of stormwater runoff and homeless encampments along the riparian corridor threaten water quality conditions.

Schneider

Schneider Creek is approximately 2.2 miles long, originating from a stormwater pond adjacent to Decatur Woods Park off of 9th Avenue SW. The first mile of Schneider Creek is piped underground. Historically, there was likely a wetland complex in this portion of the basin that was drained and filled early in the history of Olympia. A stormwater treatment facility at Giles Ave treats water before it flows from the piped section into the open channel through a forested ravine. The last 0.1 mile of the creek is piped under private property and West Bay Drive before discharging into Budd Inlet. This pipe is a partial fish passage barrier. Basin land use is primarily moderate density residential, commercial along the Harrison Ave corridor and West Bay Drive, and forested in the ravine down to West Bay below Giles.

High volumes of stormwater discharging directly to the creek are causing bank failures, streambank erosion, flooding, stream channel scour, and water quality degradation. Historic pre-stormwater regulation development and lack of available space to provide flow control limit opportunities to significantly improve conditions.

Woodard

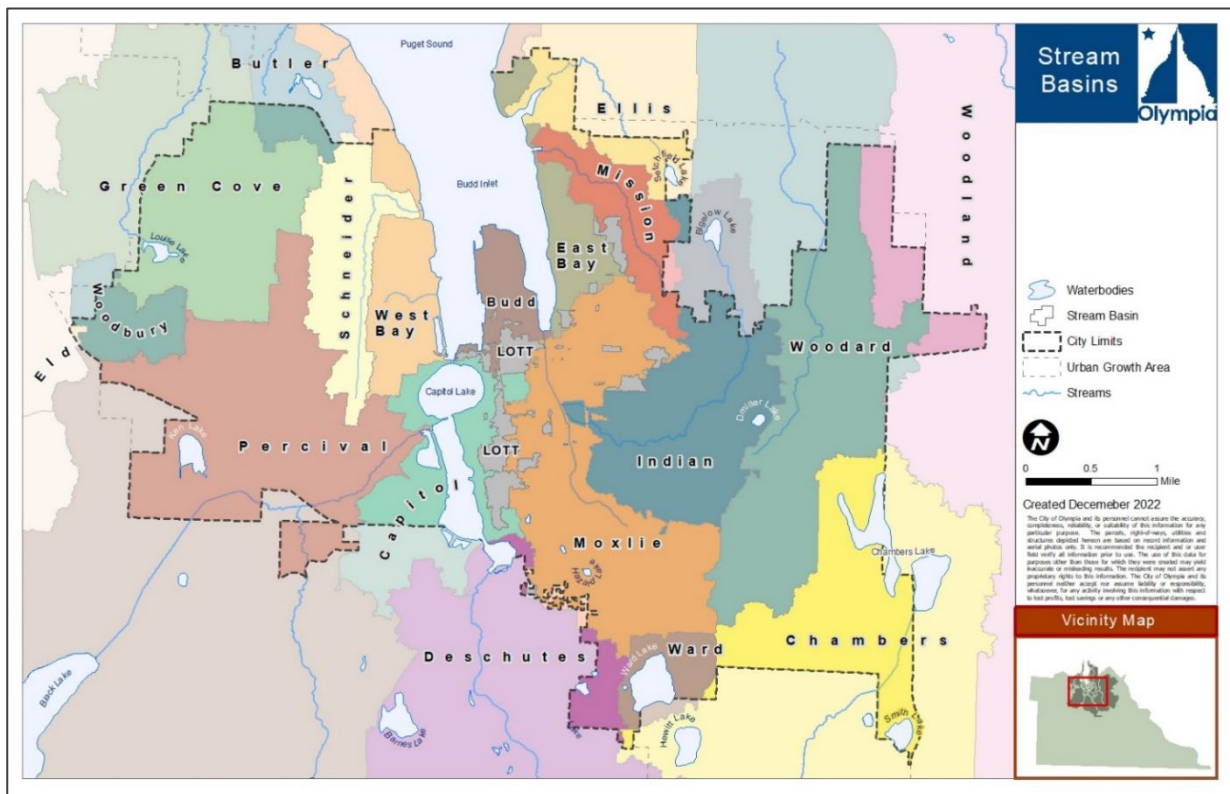
Woodard Creek's 7.8 miles originate within Olympia city limits, flowing through a series of interconnected kettles, several large wetland complexes and rural wooded terrain in the county before meeting Henderson Inlet at Woodard Bay Natural Resource Conservation Area, outside of Olympia's

jurisdictional boundary. There are over 558 acres of wetlands dotted throughout the basin. Land use in the basin is a mix of residential neighborhoods, commercial areas along Pacific and Martin Way, and rural low density residential and agricultural lands in the county. Only 31% of the basin lies within the city limits primarily consisting of large wetland complexes both up and downstream of I-5 and north of Martin way near St. Peters Hospital. Anticipated future infill and redevelopment is expected to substantially increase development pressure. Taylor Wetland stormwater facility provides infiltration and treatment of runoff from commercial areas near South Sound Center and discharges into the wetlands south of Interstate 5. The piped sections of the creek are culverts under Ensign Road, Martin Way, Pacific Avenue, Interstate 5, and a few other minor streets for a total of 0.3 miles. Woodard Creek is part of the Henderson Inlet multi-parameter TMDL for DO, bacteria, pH, and temperature. Agricultural practices and septic systems in rural areas are contributing to the problem.

Woodland

A small portion of the Woodland Creek Basin is located at the eastern-most edge of Olympia, however Woodland Creek itself does not enter the City. Three lakes - Hicks, Pattison and Long Lake, are connected by extensive wetlands and make up the headwaters of Woodland Creek in the city of Lacey. The creek is an 11-mile intermittent channel that often dries up during the summer. Downstream (north) of Martin Way, several springs provide perennial flow to lower Woodland Creek. The creek is piped under Martin Way and Interstate 5 and flows through rolling hills before discharging into Henderson Inlet outside of Olympia's jurisdictional boundary. No portion of Woodland Creek flows through Olympia. Land use includes urban residential and commercial within the Lacey and Olympia city limits and agricultural and rural residential in the county. On-site septic systems and other urban activities contribute to the contamination of shallow ground water that infiltrates into the stormwater system.

Figure 1: Basin Map



Basin Prioritization

City staff from the Storm and Surface Water Utility, including members of Water Resources Engineering & Planning and the Environmental Services team, developed and ranked 14 indicators of stormwater management needs and opportunities citywide based on data from the Receiving Waters Assessment (Table 2: Receiving Waters Assessment Indicators & Ranking). With additional input across City departments, the Utility Advisory Committee, and from external community stakeholders, these indicators were used to compare existing data from each basin with Medium or High stormwater influence. Each indicator was ranked lowest to highest using a weighted scoring methodology. Total scores were calculated to determine basin ranking for potential Stormwater Influence. After data analysis, prioritization, and consideration of additional land management factors, Indian Creek basin on the eastside of Olympia presented the greatest potential for positive water quality influence within Olympia's receiving waters and was selected for additional stormwater management action planning (See Table 3: Basin Prioritization).

Table 2: Receiving Waters Assessment Indicators and Ranking

CATEGORY	INDICATOR	SOURCE	DESCRIPTION	ASSUMPTIONS	WEIGHT
Stormwater Infrastructure & Built Environment	Total Impervious Surface	Olympia City Geodatabase	Percentage of basin covered by any type of impervious surface (all hard surfaces, including rooftops, sidewalks, concrete pads, etc. in addition to roadways)	Areas with higher overall impervious surface cover are more likely to experience water quality and quantity related issues	10
	Untreated Pollution-generating Impervious Surface Area	Olympia City Geodatabase	Percentage of basin covered by pollution-generating impervious surfaces (roads, parking lots, driveways) where stormwater enters receiving waters without water quality treatment	Indicates level of need for water quality/quantity improvements	14
	MS4 Untreated Catchment Area	Olympia City Geodatabase	Percentage of basin where surface water is conveyed to the City's Municipal Separate Storm & Sewer System without receiving water quality treatment	Indicates level of need for water quality/quantity improvements, with opportunity for City-initiated interventions	9
	Condition of SW Pipes	Olympia City Geodatabase	Condition of stormwater pipes based on age, size, material, location, and status derived from camera investigation	Identifies infrastructure in need of retrofits; level of need by basin	7

Environmental Conditions	Intact Riparian Area	Thurston Regional Planning Council, Basin Conditions Report, 2021	Percentage of basin with intact wetland and stream bank habitat, providing opportunities to improve flood control and water quality through natural areas protection and restoration	Existing conditions for green infrastructure/natural stormwater management opportunities	5
	Tree Canopy Cover	Olympia City Geodatabase	Percentage of basin with tree canopy cover. Higher percentages of tree canopy cover are shown to reduce flooding and help reduce pollutant loads in stormwater	Existing conditions for green infrastructure/natural stormwater management opportunities with actions to increase tree canopy	5
	Benthic Index of Biotic Integrity (B-IBI)	Puget Sound Stream Benthos	Results of benthic macroinvertebrate ambient water quality monitoring, average scores from 2018-2021	Captures ambient (as opposed to point-in-time) water quality conditions, indicating need for water quality improvement	5
	Aquatic Wildlife	WDFW; Wild Fish Conservancy; Squaxin Island Tribe Coastal Catchments Analysis	Aggregate score for salmon, Olympic mudminnow, shellfish habitat/designated wildlife uses	Indicates level of priority based on key aquatic wildlife use	5
	# of Flooding Hotspots	Olympia City Geodatabase	Number of "flooding hotspots" per acre	Highlights known and continuous flow/flooding issues as these may contribute to water quality degradation	5
Land Use Conditions	Current Development Density	Squaxin Island Tribe Coastal Catchments Analysis Project	Existing development density	Indicates current need for water quality/quantity improvements	5
	Urban Corridor	Thurston Regional Planning Council, Basin Conditions Report, 2021	Percent of basin that falls within 1/2 mile of highest frequency transit routes, indicative of traffic-related pollutant loading and increasing development pressure	Anticipates future need for water quality/quantity improvements	5

	Future Land Use	Thurston Regional Planning Council, Basin Conditions Report, 2021	Projected 2045 impervious, riparian & forest cover (aggregated) conditions based on anticipated increased development	Anticipates future need and new opportunities for water quality/quantity improvements	9
Other	TMDL Requirements	NPDES Phase II Municipal Stormwater Permit for City of Olympia	Whether or not a stream basin is identified by State/Federal agencies as a high priority for water quality protection	Incorporates State/Federal water quality regulations into prioritization	9
	Equity	Thurston Stormwater Equity Index	Level of burden determined according to the Thurston Stormwater Equity Index	Indicates level of priority based on socioeconomic advantages environmental justice considerations	7

Based on the collaborative weighting of indicators, the basin prioritization process placed an emphasis on impervious surface cover, existing levels of treatment, infrastructure condition, land use, TMDL regulations, and social equity (level of burden) in selecting a basin for Stormwater Management Action Planning. Additional indicator data that were included in the prioritization assessment were aquatic wildlife usage, existing tree canopy cover and intact riparian areas, water quality (via B-IBI ambient monitoring) and known flooding hotspots. Overall, Olympia took a “middle-ground” approach to receiving waters prioritization, selecting a semi-developed basin with clear need for water quality improvement with plenty of opportunities to implement a range of stormwater management actions.

Other factors influenced our decision-making once the prioritization scoring was completed. For example, the acreage and location of public property and existing stormwater infrastructure was an important consideration in determining the level of influence the City would be able to have within each basin. City-owned property creates more opportunities for new treatment facilities, retrofitting of existing infrastructure, riparian habitat protection and restoration, and other water quality interventions which are key to implementation of the SMAP. In addition to scoring high in the prioritization, Indian Creek basin has substantial City-owned, contiguous, undeveloped stream buffer habitat as well as roadways with right-of-way width that could potentially accommodate a variety of stormwater treatment interventions in untreated areas with direct outfalls to the creek. Martin Way is a major arterial intersecting Indian Creek through the center of the basin and is identified in Olympia’s Transportation Master Plan and the Martin Way Corridor Study for roadway reconstruction and redevelopment (City of Olympia, 2021; Thurston Regional Planning Council, 2022). Together these land use conditions presented more opportunity than other basins for habitat protection/restoration while leveraging transportation and development planning for construction of new or retrofit water quality treatment facilities. Few similar opportunities exist in other basins. Additionally, a unique combination of industrial, commercial, and residential land use within the creek buffer creates multiple opportunities for enhanced source control and other community outreach strategies.

Other basins that were strongly considered for Action Planning based on aquatic wildlife (salmon, shellfish, and/or Olympic Mudminnow) use were Green Cove, Woodard, and Percival. Green Cove basin

additionally presented the highest receiving waters value in terms of existing habitat health, however much of the basin within Olympia already benefits from aquatic habitat conservation through the City's 195-acre Grass Lake Nature Park and Residential Low Impact Zoning aimed at protecting Green Cove receiving waters from stormwater impacts related to development (City of Olympia, 2022). Woodard and Percival basins are also fish-bearing; however, both currently benefit from treatment via Regional Stormwater Facilities (Taylor Wetland and Black Lake Meadows/Yauger Park, respectively). That being said, there are still other retrofit opportunities in these basins that need to be addressed.

The Washington Environmental Health Disparities map (WA State Dept of Health, 2021) and draft Thurston Stormwater Equity Index (not yet published) played a notable role in selection of Indian Creek Basin for enhanced stormwater action planning. These tools were utilized to gain a snapshot of overburdened communities in Olympia to ensure an equitable distribution of the public health, environmental, social, and economic benefits of stormwater management activities. Indian Creek stood out during this analysis as having the greatest potential to improve environmental conditions for overburdened communities in the area. The Equity Index incorporates data from a variety of sources across five metrics: Housing, Education, Economy, Environment and Livability.

Table 3: Basin Prioritization

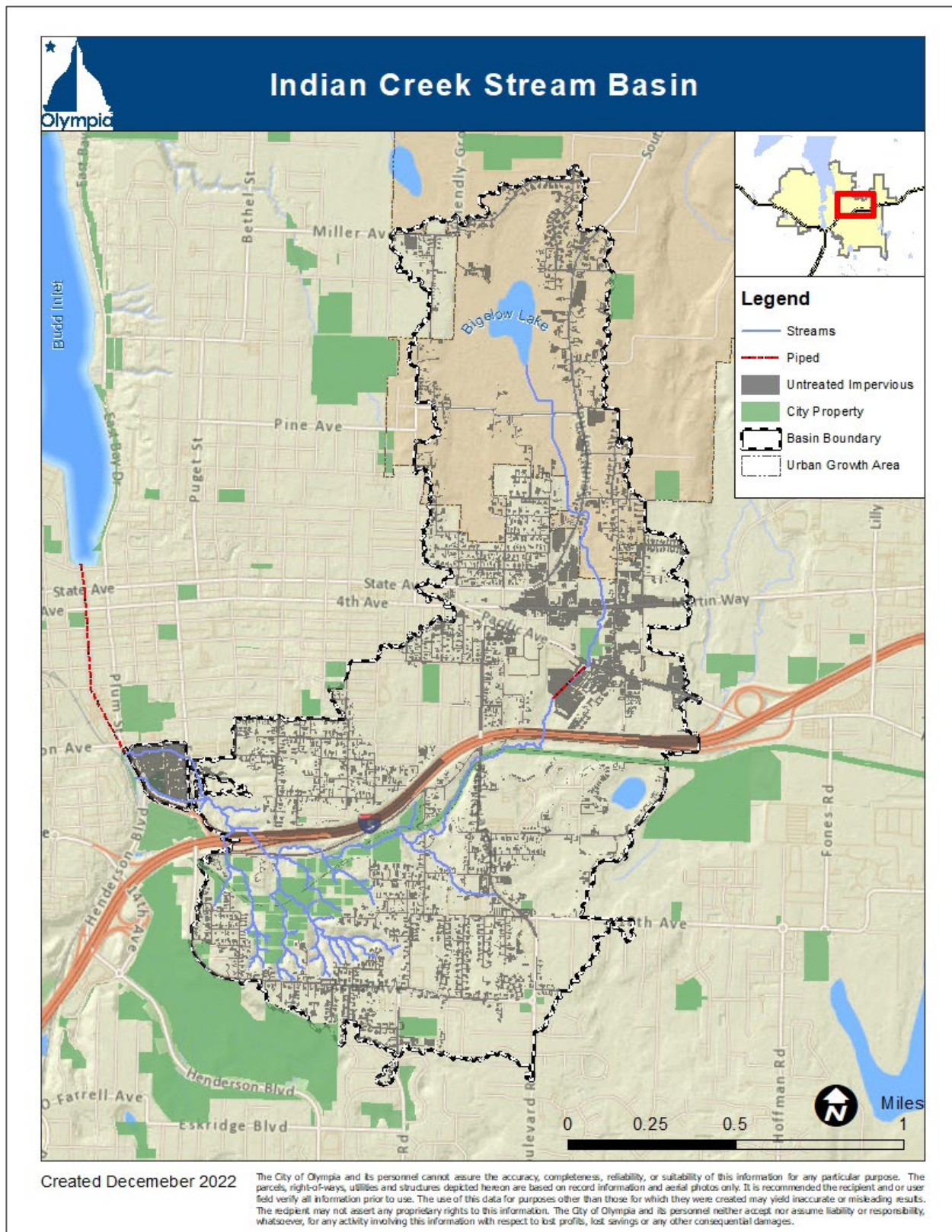
Basin	Priority Ranking	Total Impervious Surface	Untreated Pollution-Generating Impervious Area	MS4 Untreated Catchments	TMDL	Intact Riparian Area	Tree Canopy	Current Development Density	Urban Core (Trans- portation)	Pipe Condition	Flooding Hotspots	Future Land Use	B-IBI	Aquatic Wildlife Priority	Equity Index	Final Scores (Weighted)
Indian	1	3	3	2	0	1	4	3	3	3	1	5	2	1	3	25.2
Moxlie	2	1	3	4	0	1	4	3	3	3	0	5	2	1	3	24.5
Mission	3	3	3	5	0	2	2	1	1	3	0	5	1	3	1	24
Budd Inlet - East Bay	4	1	4	5	0	3	4	2	1	4	1	3	N/A	1	2	24
Budd Inlet - West Bay	5	3	4	5	0	2	0	2	3	3	1	3	N/A	1	2	23.8
Woodard	6	3	1	2	1	3	4	3	3	2	0	3	1	3	3	21.8
Schneider	7	3	1	5	0	1	0	2	2	2	1	4	3	2	2	20.8
Percival	8	1	1	2	1	2	1	3	1	5	1	4	3	3	2	20.6
Chambers	9	2	3	1	1	2	2	1	0	2	0	4	N/A	2	2	17.9
Green Cove	10	2	2	1	0	3	0	1	1	1	0	3	1	3	1	14.3
Score range - highest # equals highest priority		1-3	1-4	1-5	0 or 1	1-3	1-4	1-3	1-3	1-5	0 or 1	1-5	1-3	1-3	1-3	

Stormwater Management Action Plan

Following basin prioritization, additional analysis of Indian Creek basin identified priority areas within the catchment where enhanced stormwater management actions would be both feasible and impactful. The following Stormwater Management Action Plan was developed focusing primarily on untreated pollution-generating impervious surfaces within the City's MS4 where water quality improvements are most needed. Newly drafted TMDL requirements for Budd Inlet will be directly addressed in the SMAP for Indian Creek Basin. Enhanced maintenance, source control, community engagement, and land use actions were further informed by the following key basin conditions:

- Traffic counts and locations of untreated arterial roadway segments
- Catch basin sediment loads
- Conveyance pipe, infrastructure age and condition
- Anticipated development impacts over next 20 years
- Riparian habitat restoration/conservation opportunities
- Current city-owned property and potential for acquisition

Figure 2: Map of Indian Creek Basin



Treatment Facilities

Capital project selection and development were informed by existing and future basin conditions. City staff identified six possible locations for stormwater retrofit projects to address areas of untreated pollution-generating impervious surface within the MS4 with direct outfalls to Indian Creek receiving waters (Figure 3 in the Appendix: Map of Proposed Treatment Facilities & Habitat Projects). In order to reduce 6PPD and other toxins associated with roadway pollution, high-traffic arterials discharging stormwater directly to the stream were prioritized for treatment. The six proposed project areas take advantage of favorable right-of-way or land ownership conditions for locating retrofit facilities and leverage projected 20-year transportation and sub-area redevelopment plans. These projects combine to treat a total catchment area of 76.67 acres.

The City contracted with engineering firm KPG Psomas in January through March of 2023 to evaluate water quality treatment feasibility and develop conceptual design alternatives for each site (See Appendix A: Stormwater Facility Retrofit Concept Designs). All facilities were designed using the Western Washington Hydrology Model (WWHM2012) to provide treatment for at least 91% of the total runoff volume per the 2022 Olympia Drainage Design & Erosion Control Manual (DDECM). Alternatives assessed for each site are provided below in order of priority:

- 1) Bioswale/biofiltration (Low Impact Development)
- 2) Modular Wetland Systems w/optional pretreatment (Enhanced Treatment)
- 3) Stormfilter Vaults w/optional pretreatment (Basic Treatment)

Final project design, timeline, and budget are subject to change based on additional site survey, wetland delineation, underground utility locations, geotechnical studies, and public input. All project alternatives as described assume infiltration is infeasible until further site reconnaissance can be performed. Additional site evaluation and design work will occur as funding is identified through capital project planning. Timing for all projects is currently projected to fall within the 7 to 20-year timeframe unless significant additional funding sources and capacity to manage capital projects are identified. For a list of potential funding sources see table 5: Summary of Potential Funding Sources.

Table 4: Proposed Treatment Facilities

Project Site	Location	Catchment Area (Acres)	Treatment BMP	Timeline	Budget
Boulevard Rd North	Pacific Ave SE to I-5	23.31 (64% Impervious)	<i>Alternative A:</i> Bioswale	7-20 year timeframe	\$1,736,174
			<i>Alternative B:</i> Filter Vaults		\$1,841,895
			<i>Alternative C:</i> Custom Stormfilter		\$324,402
Boulevard Rd South	McKinley Pl SE to I-5	2.82 (65% Impervious)	<i>Alternative A:</i> Bioswale	7-20 year timeframe	\$585,800
			<i>Alternative B:</i> Filter Vault		\$252,460

Martin Way	Pattison St to Chambers St SE	12.59 (84% Impervious)	<i>Alternative A:</i> Bioswales <i>Alternative B:</i> Filter Vaults	7-20-year timeframe	\$1,409,581 \$794,472
Pacific Ave	Landsdale St SE Langford Rd SE	32.35 (41% Impervious)	<i>Alternative A:</i> Filter Vaults	7-20-year timeframe	\$603,873
Quince Street	Former Quality Inn Site	5.60 (91% Impervious)	<i>Alternative A:</i> Bioswale & Modular Wetland System	6-year timeframe	\$491,527
Devoe St ROW	City-owned ROW between 513 & 527 Devoe St SE	N/A	After initial field assessment, on-site treatment determined to be infeasible do to slope and wetland conditions	N/A	N/A

Maintenance & Operations

1. Street Sweeping
2. Catch Basin, Drainage Ditch & Conveyance Pipe Maintenance
3. Encampment Hygiene

2.1 Street Sweeping

As of 2022 the Storm & Surface Water Utility has had one street sweeper and one full-time sweeper operator to cover 526 street lane miles and 82 bike lane miles. Original sweep zones were set by the number of miles and by priority locations (e.g., bridges, known flooding areas, medians). Typically, downtown streets are swept twice a week, arterial streets and streets with bike lanes every other week, and residential streets at least once a year. Even though the sweeper is occasionally diverted for emergency responses and residential requests, this pattern optimizes the sweeper's ability to cover the entire city.

The current sweeper program includes seasonal and emergency sweeping processes. The operator, or a qualified substitute operator, works overtime to sweep after community events and other special needs (e.g., parades, street fairs, after work emergencies). During the fall, streets known for heavy leaf drop are targeted for a period of six weeks. A substitute operator takes over the sweeper in the afternoons to accommodate the extra sweep time needed for leaf pick up. After the winter snow melts, the City rents a broom sweeper to concentrate on sweeping streets along the sanding route that is operated by a substitute operator.

The City of Olympia will be adding an additional sweeper in 2023 with the goal of covering 8,000 roadway miles and collecting 1,000 tons of debris annually, with potential for enhanced sweeping intervals along high traffic roadways such as Martin Way, Pacific Avenue, Boulevard Rd, or where catch basins receive consistently high sediment loads.

Existing, Enhanced, or New Activity?	Description	Timeline	Budget	Funding Source
Enhanced	Major arterials with outfalls to Indian Creek, such as Pacific Ave and Martin Way, are swept every other week. Other roadways lacking stormwater treatment are prioritized for sweeping.	Ongoing	\$600,000 annually for two sweepers	Storm & Surface Water Utility Rates

2.2 Catch Basin, Drainage Ditch and Conveyance Pipe Maintenance

The City has identified a need to inventory catch basin volume for more accurate analysis of sediment loading. Current data indicates how full a basin is during inspections and cleanout based on depth alone, however only two of 20 citywide catchment areas has been inventoried for total sediment volume. Being able to assess sediment loads based on total holding capacity as opposed to depth alone will aid in more accurately identifying sediment hot spots and provide additional indications of where programmatic and operations support to reduce sediment loads is needed. Completing this inventory may take place over the next 6 years beginning with Indian Creek basin.

Drainage ditches are regularly maintained throughout the city to reduce flooding. In some instances, ditches may accumulate sediment without contributing to flood-related issues and are therefore a lower priority for maintenance. However, to reduce sediment loads entering Indian Creek receiving waters we have identified approximately 1,918 linear feet of drainage ditches within the basin where addressing deferred ditch maintenance will minimize sediment-related impacts to water quality in these areas. Depending on level of deferred maintenance, these ditches will be cleaned out on a case-by-case basis as needed, or integrated into the annual maintenance plan.

Stormwater conveyance pipe condition was identified during the receiving waters assessment and basin prioritization as an important factor impacting water quality regarding potential for sedimentation. The Stormwater Utility developed a conveyance pipe condition criticality rating in 2015 to prioritize which pipes would be televised for further inspection and maintained based on those findings. Other water quality related priorities include pipes intersecting steep slopes, pipes running parallel to sanitary sewer lines, and flooding hotspots in proximity to receiving waters. Pipe criticality ratings in these areas of Indian Creek Basin may be ranked higher where prioritized conveyance pipe maintenance will reduce sediment loads into the creek and its tributaries.

Existing, Enhanced, or New Activity?	Description	Timeline	Budget	Funding Source
Enhanced	Enhanced Elevated priority levels for ditch and conveyance pipe cleaning in Indian Creek Basin	Ongoing	\$1,500 annually	Stormwater Utility rates
New	Inventory of catch basin volumes within Indian Creek Basin	3-6 month project	0.5 FTE Intern	Stormwater Utility Internship funds

2.3 Encampment Hygiene

In recent years, an undeveloped greenspace along Wheeler Avenue and adjacent to Indian Creek has been utilized as an unsanctioned encampment by unhoused individuals. Informal camp sites have been established on City, Washington State Department of Transportation (WSDOT), and privately-owned properties, with much of the activity taking place within the I-5 WSDOT right of way. In January of 2022, the City and WSDOT signed an interlocal agreement supporting a collaborative effort to relocate people from the encampment to more stable housing and begin cleaning up the impacted areas. The agreement allocated \$200,000 in funding to support the effort, which included solid waste removal, erosion control, and other actions to remediate adverse impacts to the landscape.

Encampment proximity to Indian Creek and location within its natural wetland and riparian buffers threaten the overall health of the stream, with direct impacts to water quality, bank stability, and sedimentation. To ensure compliance with Olympia's TMDL regulations for Budd Inlet, protecting Indian Creek from these negative water quality influences is key. Moving forward, the City of Olympia Clean Team, Environmental Services team, WSDOT continue to collaborate on efforts to minimize public and environmental health impacts of encampments along Wheeler Ave and Indian Creek. These actions may include providing dumpsters and portable toilets to assist solid waste management, installing temporary erosion and sediment control structures or materials to prevent harmful debris from entering the stream, conducting future clean-ups, and directly engaging with and educating camp residents. Additionally, a broader effort is underway in partnership with other local agencies and organizations to construct affordable housing and secure shelters in proximity to this location. The aim is to gradually decrease the number of people living in unsanctioned encampments in the Indian Creek buffer over time.

Existing, Enhanced, or New Activity?	Description of proposed Action	Timeline	Budget	Funding Source
Existing	Encampment cleanup along Wheeler Avenue in partnership with WSDOT	Ongoing	\$200,000 initially, TBD for future efforts	WA State Dept of Transportation

Land Management

1. Land Acquisition
2. Land Use & Development
3. Habitat Restoration

3.1 Land Acquisition

The City has examined location and geography of undeveloped, privately-owned parcels with potential influence on receiving waters to assess opportunities for land acquisition across all basins. Indian Creek basin stands out, containing a compelling series of properties adjacent to the stream and/or within relative wetland buffers with opportunity for riparian habitat conservation and/or restoration. Properties with acquisition potential lie both in and outside the Olympia city limits. The Storm and Surface Water Utility has \$125,000 in the annual capital budget for land acquisition where City ownership will promote water quality related habitat function, provide land needed to locate stormwater treatment infrastructure, or enable other key stormwater management actions to improve conditions of the receiving waters. Approximately 10 acres within the basin have been identified for

tentative acquisition consideration, which will occur on a case by case basis and in adherence to City policy regarding land acquisition parameters and process.

Existing, Enhanced, or New Activity?	Description	Timeline	Budget	Funding Source
Enhanced	Property acquisition for conservation and/or restoration of aquatic habitat	Ongoing	\$125,000 annually	Stormwater Utility Rates

3.2 Land Use & Development

Land use within Indian Creek basin varies greatly from over 150 acres of contiguous undeveloped greenspace with varying ownership (private, city-owned, WSDOT) to high density commercial development, with a variety of residential housing configurations in between (from 4 units per acre single family to 18 units per acre multifamily). In 2016, pursuant to the 2013-2018 Western WA Phase II Stormwater Permit, Olympia updated code requiring the use of low impact development (LID) best management practices (BMPs) for stormwater management on most development and redevelopment projects (City of Olympia Municipal Code, 2022). Although much of Indian Creek Basin is already developed, substantial new and redevelopment work is anticipated in the area over the next 20 years, creating opportunities to update stormwater infrastructure to meet current standards in already developed areas while protecting receiving waters conditions downstream in the basin where riparian habitat will remain intact under City ownership.

In May of 2022 the Thurston Regional Planning Council published the Martin Way Corridor Study describing long-range redevelopment goals within the area (Thurston Regional Planning Council, 2022). The Land Use Alternatives Analysis Memo describes the following performance measures that may create opportunity for private-public investments in green stormwater infrastructure in Indian Creek basin:

- Improve Martin Way’s visual appeal with street trees and landscaped buffers between sidewalks and roadways.
- Increase access to public space and amenities, such as parks, trailheads, or community nodes.

Additionally, the City of Olympia’s 2021 Transportation Master Plan identifies a 2,200ft segment of Martin Way intersecting Indian Creek for roadway reconstruction in the 20-year capital plan. This 4-lane, currently untreated roadway segment has been prioritized for treatment due to proximity to the creek and the feasibility of constructing a new treatment facility given the width of the right-of-way and favorable adjacent landscape conditions. The Stormwater Utility will continue to collaborate with other City departments and regional agencies to leverage existing plans and projects as this part of the city continues to grow and evolve. No other significant code or policy updates are anticipated at this time in association with implementing the Indian Creek SMAP. The relevant sections in the 2025 periodic update to Olympia’s Comprehensive Plan are expected to support land use actions described.

3.3 Habitat Restoration

The City of Olympia owns and manages approximately 65 acres of riparian and upland forested habitat within Indian Creek Basin along the Karen Fraser Woodland Trail, a majority of which falls within the 200’ buffer of the stream, its tributaries and connected wetlands. The ecological condition of these

landscapes ranges from healthy, second-growth mixed conifer-deciduous forest with a diversity of native trees, shrubs, and groundcovers to highly disturbed with marginal habitat function remaining. Pressures include dense infestations of invasive weeds such as English ivy (*Hedera helix*) and Himalayan blackberry (*Rubus armeniacus*), poor soils due to a history of nearby development, damage to or removal of vegetation at encampment sites within the creek buffer, and lack of stewardship (including illegal dumping of yard waste) by private property owners. South of I-5 and below an existing treatment facility at Frederick St SE & Wheeler St SE, a majority of the stormwater runoff draining roadways and residential neighborhoods in the southern portion of the basin enters Indian Creek untreated via surface flow and direct discharge from the City's MS4. Including private properties, the combined ~150 acre contiguous natural area serves as an unofficial stormwater retention and infiltration facility through the natural processes that healthy native habitat structure and function supports (Puget Sound Partnership, 2021). Habitat conservation and restoration in this natural area will be key to protecting downstream receiving waters from development impacts higher up in the watershed.

In 2013 the City of Olympia developed the Habitat Stewardship Strategy to characterize and prioritize the City's remaining natural habitat for conservation and restoration efforts, with an emphasis on aquatic ecosystems (City of Olympia, 2013). In addition to implementation by the City's Vegetation Operations Crew, the plan also enables partnerships with private landowners to promote stewardship on properties adjacent to City natural areas, particularly those in proximity to aquatic habitat. The Habitat stewardship Strategy identified over 200 properties in the Indian Creek basin with potential to provide technical assistance and initiate voluntary stewardship that would promote the overall health of the stream buffer, including a residential rain garden incentive program. This list has been updated for the Indian Creek SMAP with implementation to begin over the next six years.

Similarly, in partnership with the Olympia Parks Department and the Thurston Stream Team, the City provides hundreds of volunteer stewardship opportunities each year to engage community members in activities that improve habitat, such as invasive weed removal and planting local Pacific Northwest adapted species. The location of the Karen Fraser Woodland Trail along Indian Creek provides easy access for volunteer habitat restoration work parties, community-based science explorations, and other opportunities for hands-on engagement and learning about the importance of Indian Creek and the impacts of stormwater on the overall health of Puget Sound. The Stormwater Utility will continue to collaborate with our partners on annual and strategic program planning to ensure Indian Creek benefits directly from the various stewardship efforts taking place.

Existing, Enhanced, or New Activity?	Description	Timeline	Budget	Potential Funding Sources
New	Habitat restoration on City-owned properties in Indian basin Private landowner technical support and incentive programming	Beginning 2024 with ongoing maintenance and monitoring	\$30,000 annually for first 5 years	Rose Foundation grant; National Estuary Program Habitat Grant; National Fish & Wildlife 5-Star Urban Waters Grant; Stormwater Utility Rates

Outreach & Engagement

1. Business Inspections
2. Community & School Programming

4.1 Business Inspections

Pursuant to section S5.C.8 of the NPDES stormwater permit, Olympia has developed a Source Control program and is on target to begin implementing these actions in early 2023. Over 600 publicly and privately-owned institutional, commercial, and industrial sites have been identified as having the potential to discharge pollutants to the City's MS4. Of those, nearly 50 are located within the Indian Creek basin, approximately one third of which are of particular interest. This is due to the nature of business activities regarding potential to pollute, and proximity to the stream or catchment areas with direct, untreated outfalls to the stream. These businesses may be elevated in priority for Source Control inspections. This will ensure businesses are employing operational and structural source control BMP's pursuant to Olympia Municipal code 13.16, designed to protect Indian Creek and its tributaries (Olympia Municipal Code, 2022). These activities will include ongoing engagement to bring businesses and sites into compliance when necessary, sharing updates to City ordinances and code related to structural source control or drainage and erosion control, sharing water quality treatment and pollution prevention BMPs, and using dumpster lid behavior change campaign materials and outreach methods outlined in Olympia's current Stormwater Management Program Plan.

Existing, Enhanced, or New Activity?	Description	Timeline	Budget	Funding Source
New per 2019-2022 NPDES Phase II Permit	Business Inspections, development and dissemination of operational source control BMPs, and engagement with businesses and properties prioritized for their potential to pollute Indian Creek receiving waters.	Ongoing beginning January 2023	0.25 FTE	Stormwater Utility Rates

4.2 Community & School Programming

The City of Olympia partners with neighboring jurisdictions (Tumwater, Lacey, and Thurston County) to form the Regional Environmental Education Partnership (REEP), which includes hands on engagement opportunities through Thurston Stream Team. All together, these efforts raise awareness about local and regional water quality issues as they relate to everyday activities in our communities and the health of our natural environment. A wide variety of platforms are utilized to deliver key messages, from print materials, newsletters, in-person and online workshops, field trips, science investigations, ecosystem monitoring projects, and social media. Pollution prevention campaigns encourage people to keep dumpster lids closed, bag and trash dog waste, practice car care and natural yard care, and more. Many of these campaigns use social marketing methods tailored to specific audiences to adopt behaviors that protect surface waters.

Olympia also recognizes the value in engaging specifically with youth and young adults in conversations around the health of the natural environment and how that relates to the well-being of both human and non-human communities. Through partnerships with South Sound Green and the Olympia School District, the City provides direct education along with curriculum and materials on issues regarding

stormwater – what it is, why it’s important, and what can be done to address it. Beginning in 2023, new stormwater curriculum is being developed specifically for every sixth grader in Olympia.

Understanding that community engagement is key to pollution prevention at the site scale, achieving water quality goals within Indian basin will rely on shifting perspectives and behaviors from everyone who lives, works and plays in the basin. Prioritization of Indian Creek Basin in the context of stormwater management planning will be highlighted whenever relevant to ongoing environmental education and engagement activities in the area.

Existing, Enhanced, or New Activity?	Description	Timeline	Budget	Funding Source
Existing	Stormwater community outreach and education	Ongoing	0.10 FTE	Stormwater Utility Rates
New	Development of stormwater curriculum for Olympia 6 th grade classrooms	2023	0.15 FTE	Stormwater Utility Rates

Adaptive Management

Communications, Outreach and Feedback

The Storm & Surface Water Utility has access to a wide variety of communication tools to provide updates on the Indian Creek Basin SMAP and solicit feedback as the plan evolves over time. As activities described in the plan are implemented, both virtual and in-person community engagement will ensure that potential negative impacts are identified and mitigated prior to moving forward. As infrastructure retrofit capital projects move forward, community co-design will occur whenever possible early in the planning process. Stakeholders who provided input during selection and analysis of receiving waters data will be kept informed and sought out for further guidance or feedback as needed.

Other City programs and departments such as Transportation, Community Planning & Development, Habitat Stewardship, and Parks will continue to be engaged to promote cross-department collaboration on project design and implementation. Olympia will also work with Thurston County to ensure that efforts to carry SMAP activities into the Urban Growth Area are shared. Similarly, land use and development planning efforts in nearby City of Lacey or in conjunction with the Thurston Regional Planning Council will continue to inform future plans for capital projects and other management activities in the basin.

Summary of Funding Sources

Table 5: Summary of Potential Funding Sources

Grant Program	Source	Water Quality	Habitat	Stormwater Infrastructure	Planning & Research	Community Engagement	Environmental Justice
Clean Water Act Section 319	Environmental Protection Agency (EPA)	X	X	X	X	X	
Climate Resilient Riparian Systems Lead	EPA	X	X				
Puget Sound National Estuary Program	EPA/WA Ecology	X	X	X	X	X	
Centennial Clean Water Program	WA Ecology	X	X	X			
Clean Water State Revolving Fund Loans	WA Ecology	X	X	X			
Stormwater Financial Assistance	WA Ecology	X		X			
Stormwater Grants of Regional or Statewide Significance (GROSS)	WA Ecology	X	X	X	X	X	X
Watershed Planning Implementation & Flow Achievement	WA Ecology	X	X				
Salmon Recovery Program	WA Recreation & Conservation Office (RCO)		X			X	X
Land & Water Conservation Fund	RCO	X	X		X	X	X
Estuary & Salmon Restoration Program	WA Dept of Fish & Wildlife		X				
Five Star Urban Waters	National Fish & Wildlife Federation		X			X	
Puget Sound Stewardship & Mitigation Fund	Rose Foundation	X	X			X	X

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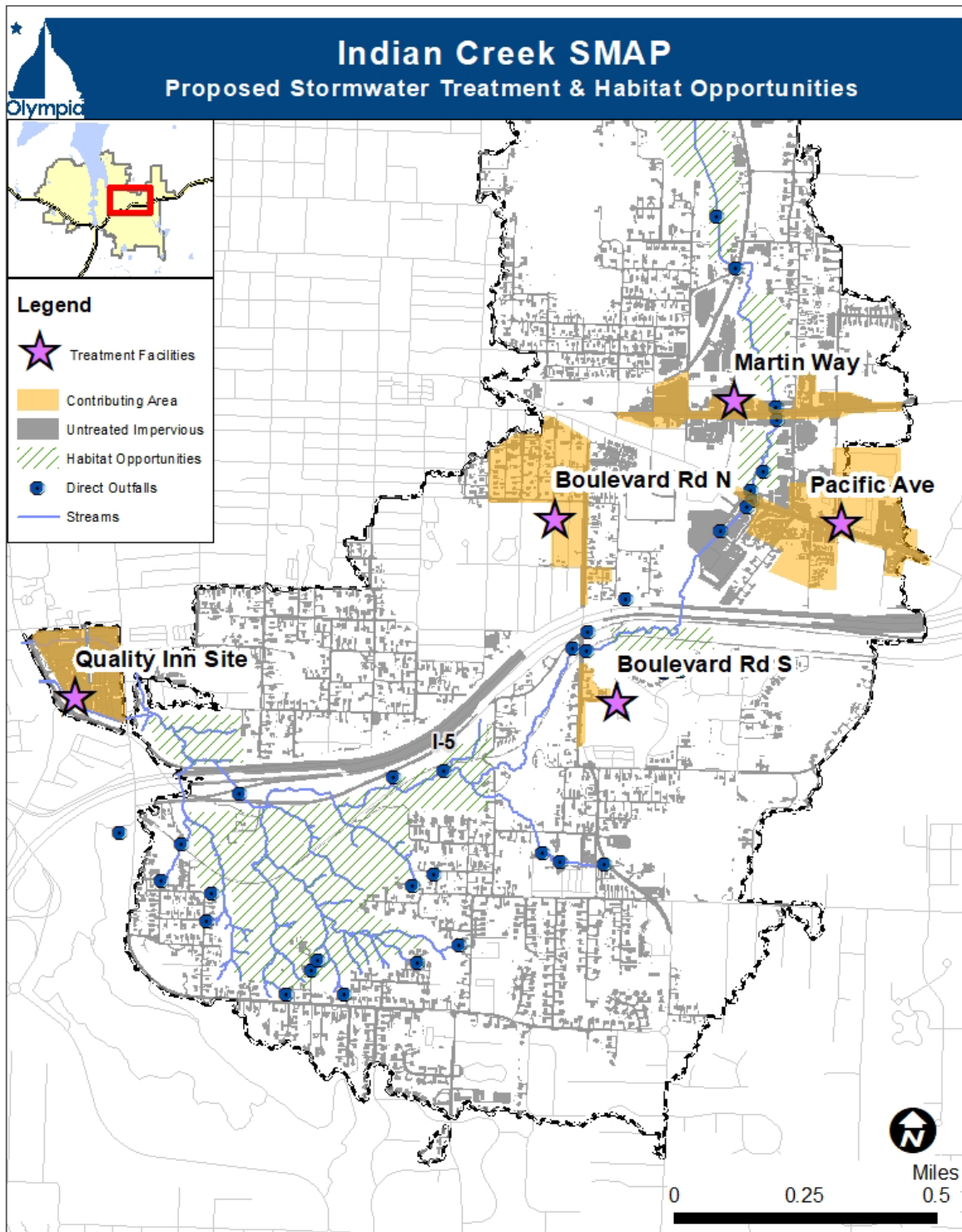
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Appendix A: Stormwater Facility Retrofit Concept Designs

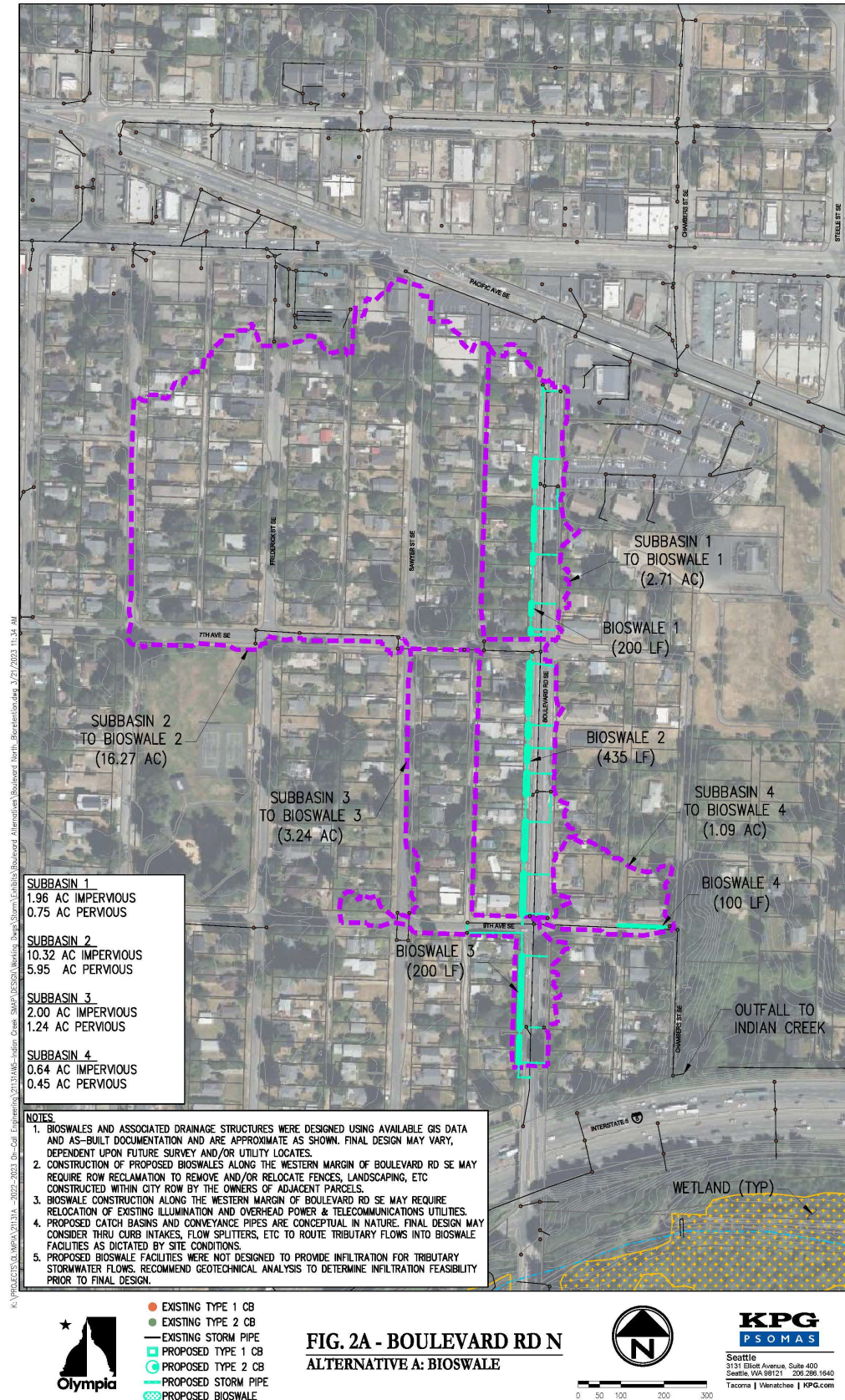
Figure 3: Map of Proposed Stormwater Treatment Facilities & Habitat Opportunities



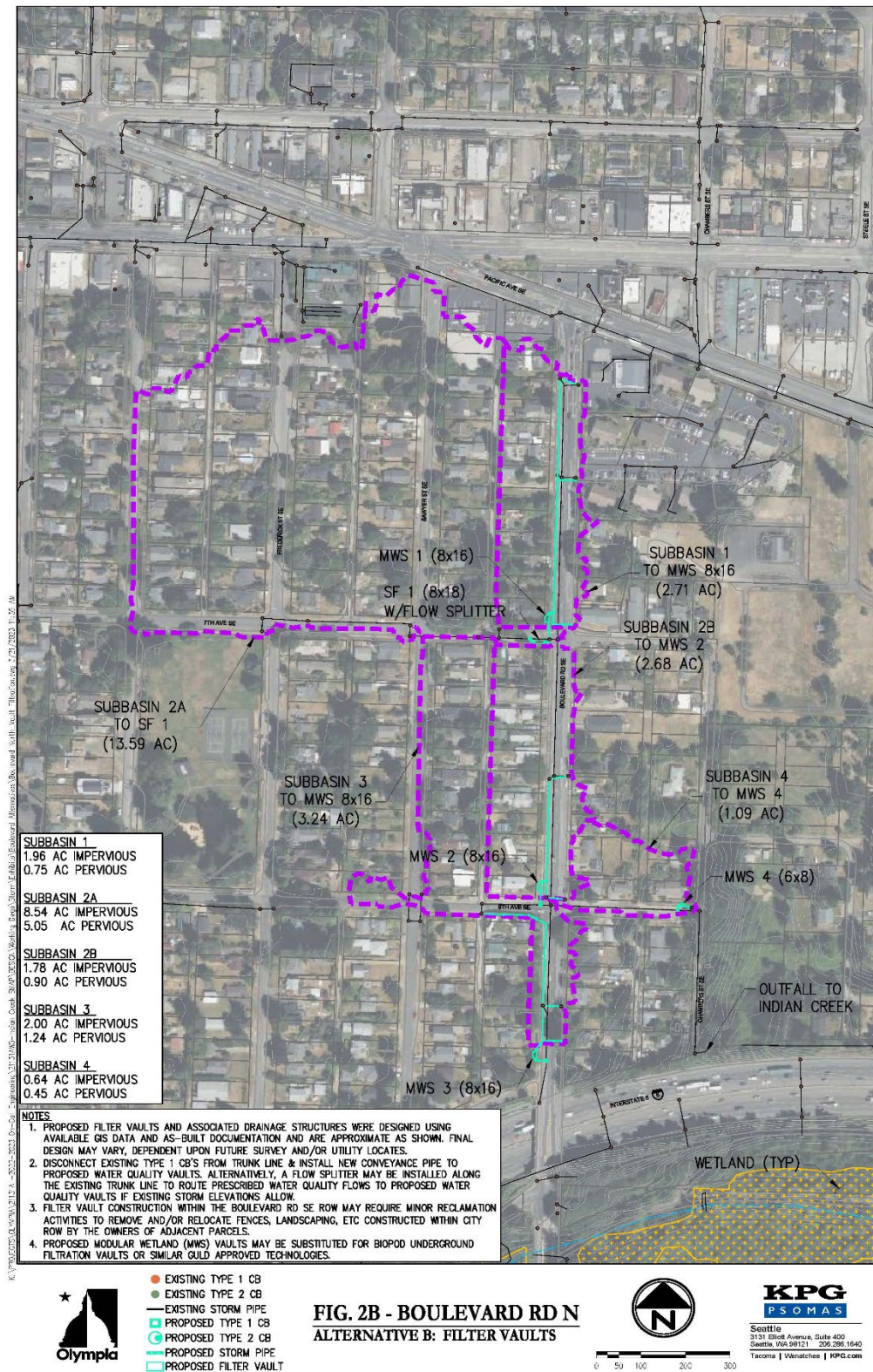
Created December 2022

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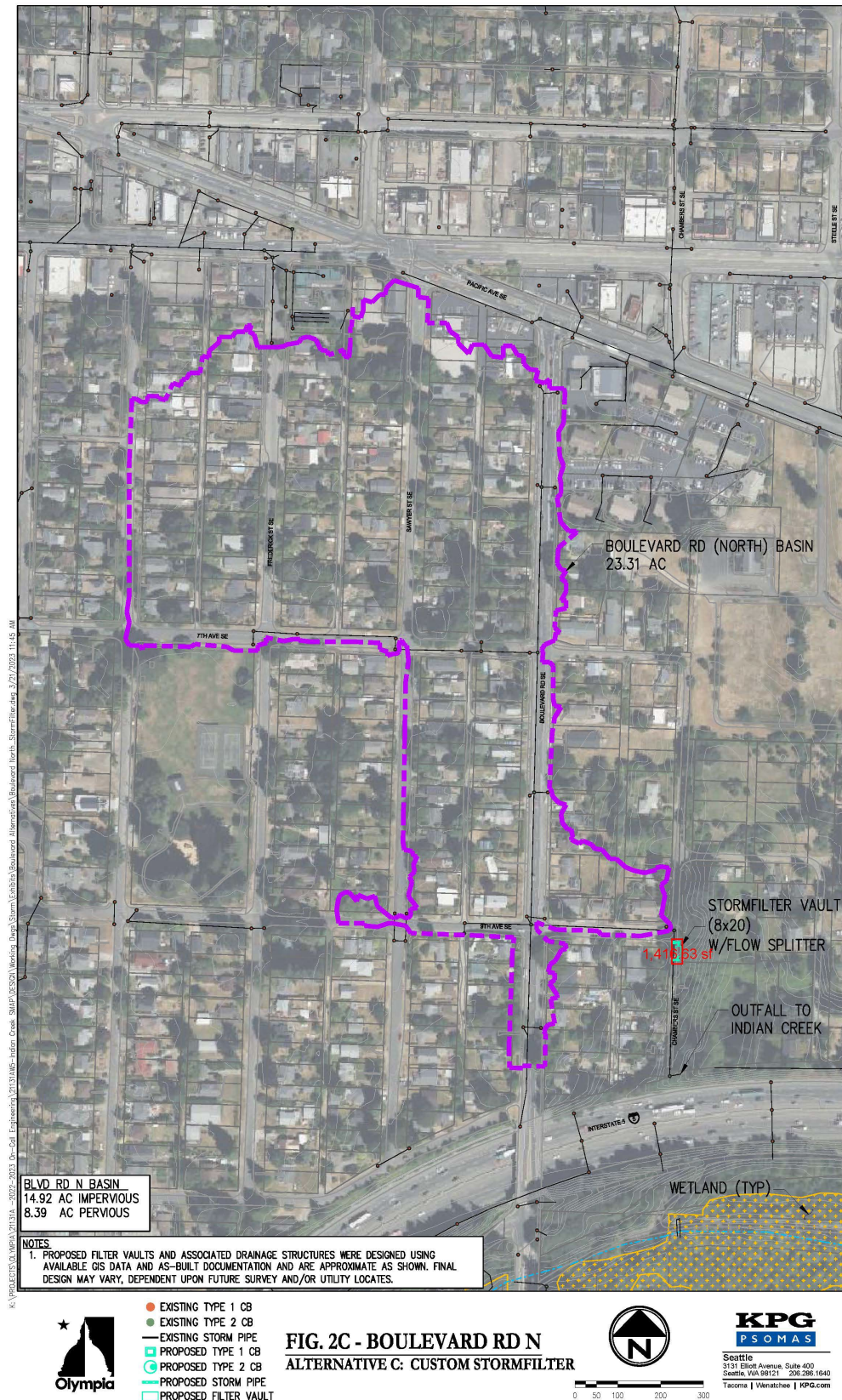
Boulevard Road North - Alternative A (Bioswale Design)



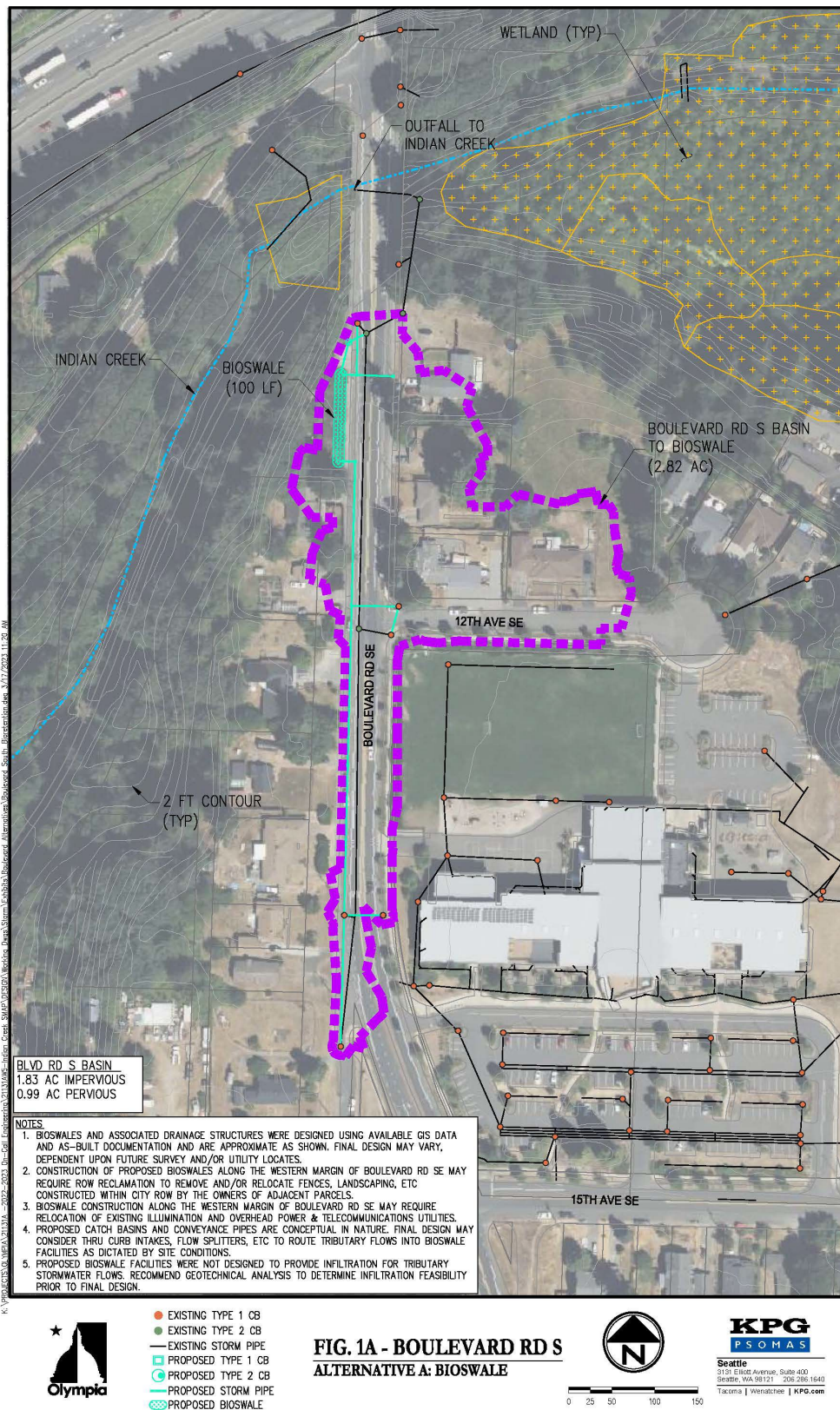
Boulevard Road North - Alternative B (Filter Vaults)



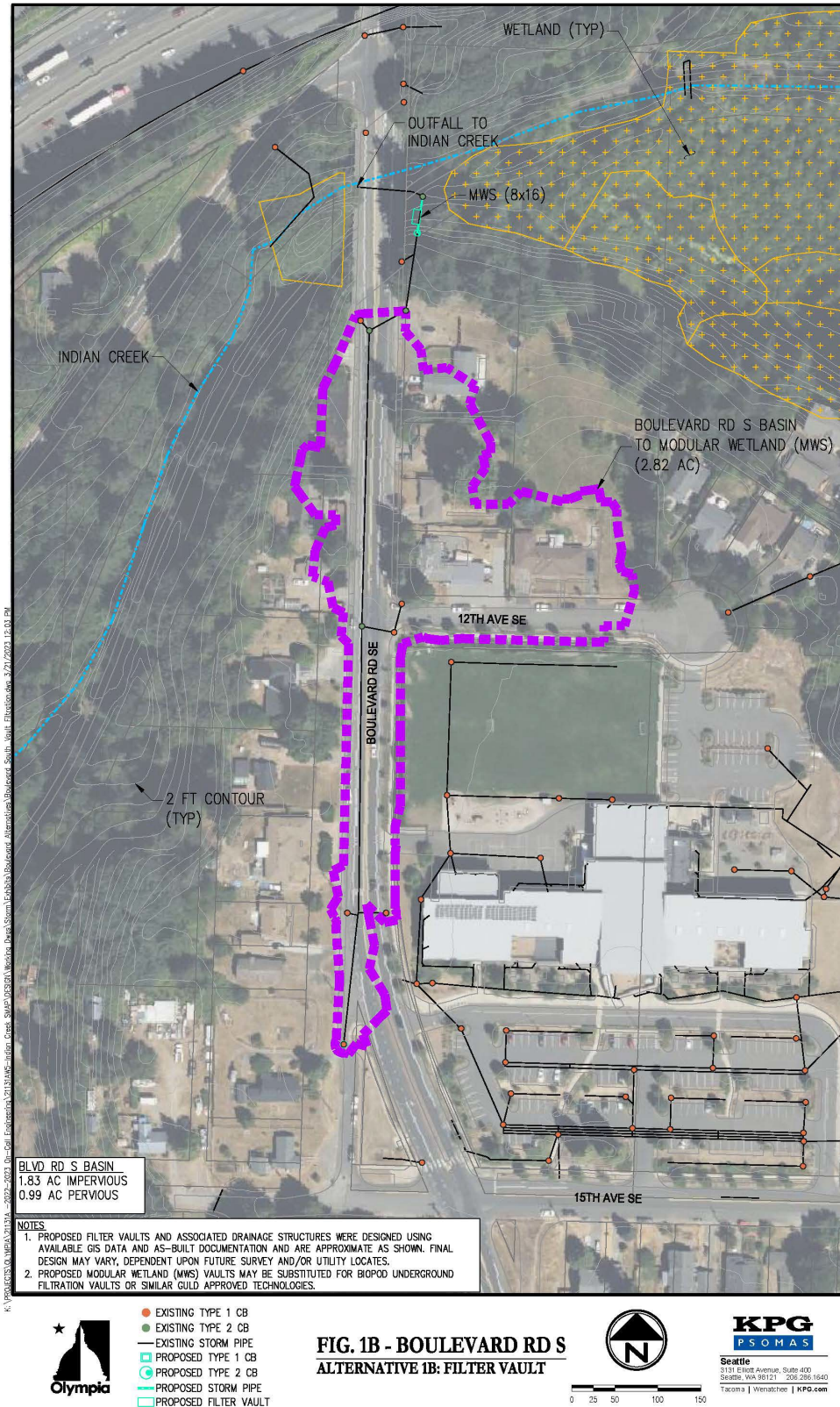
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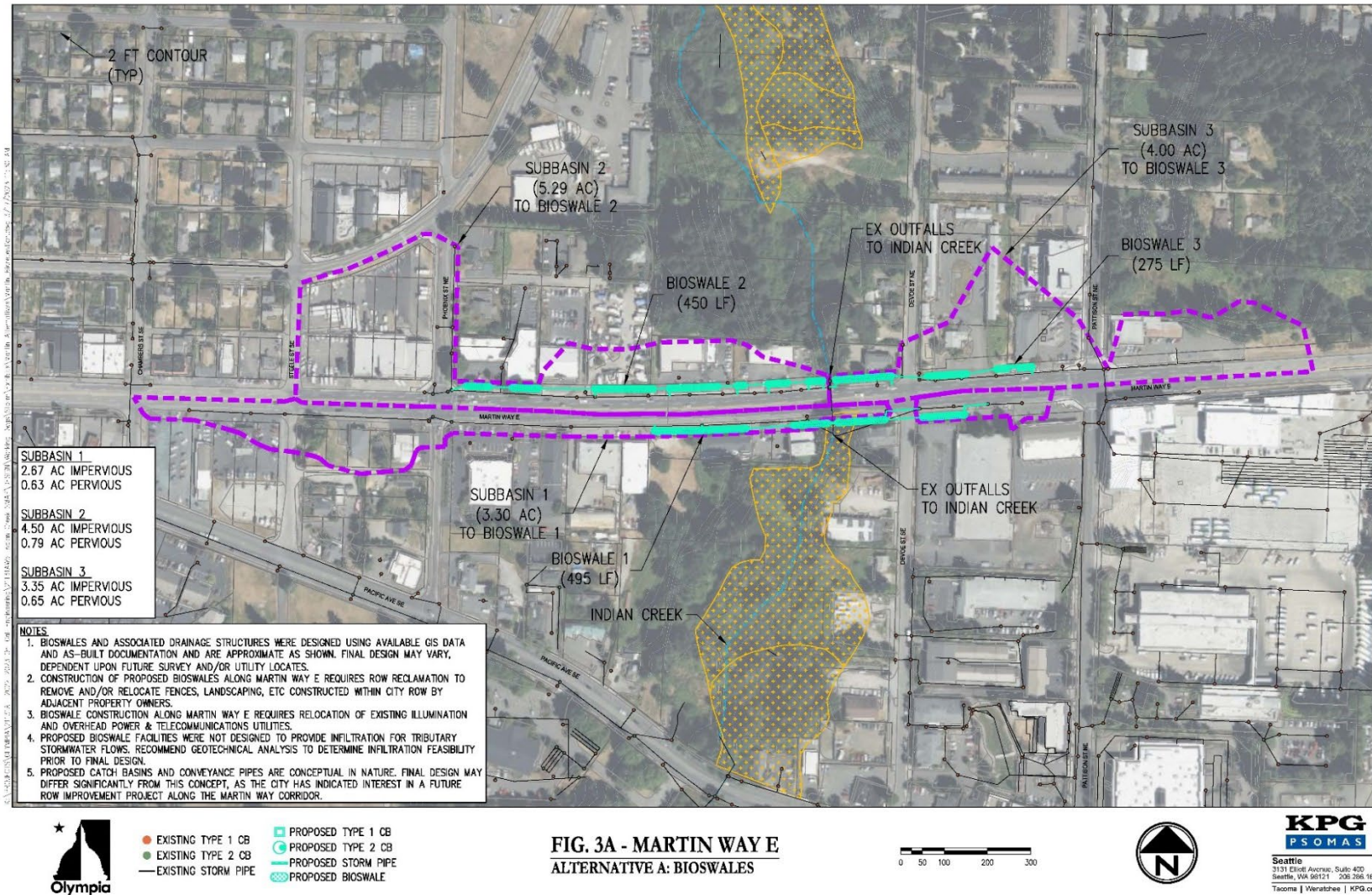
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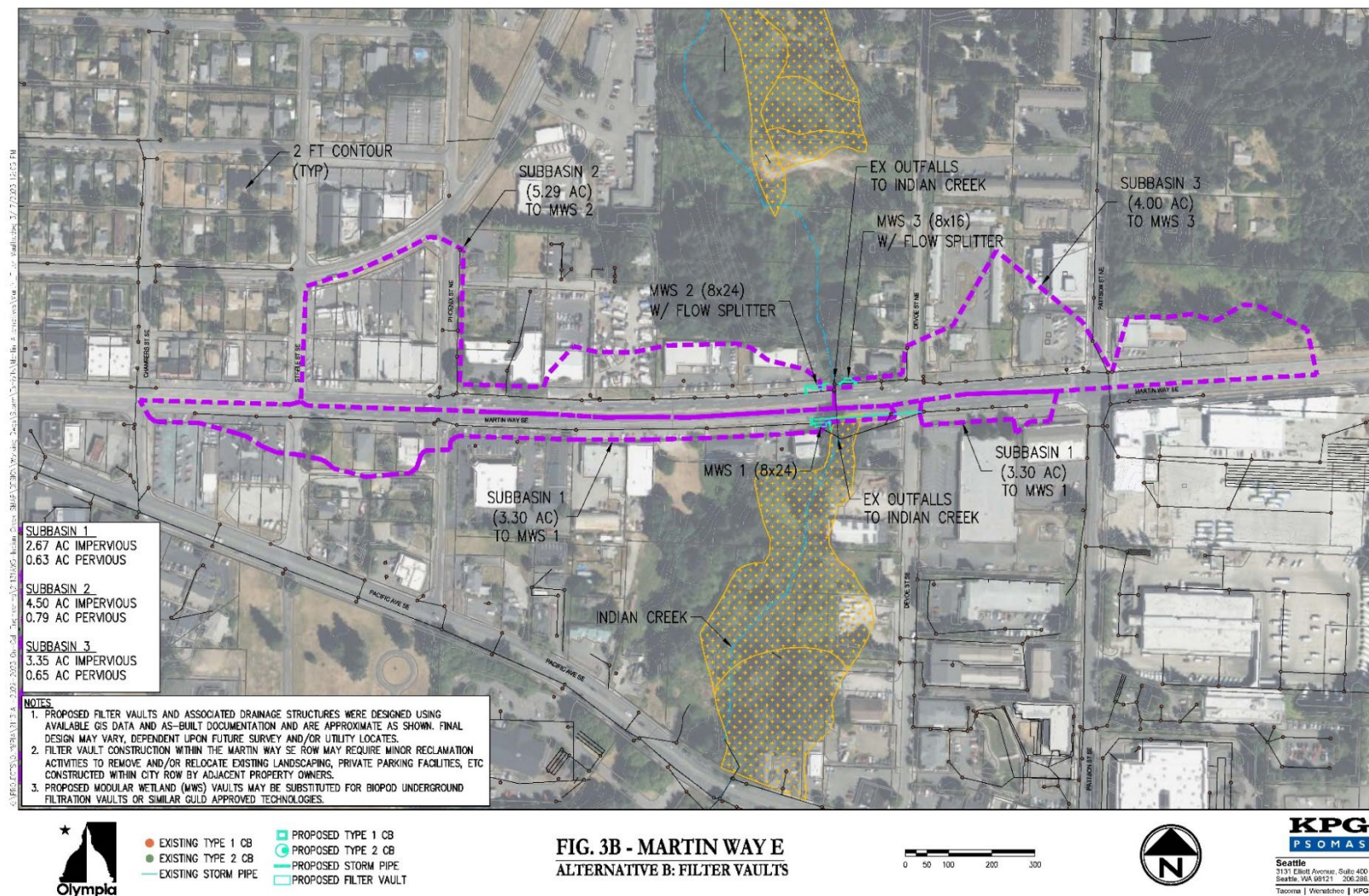
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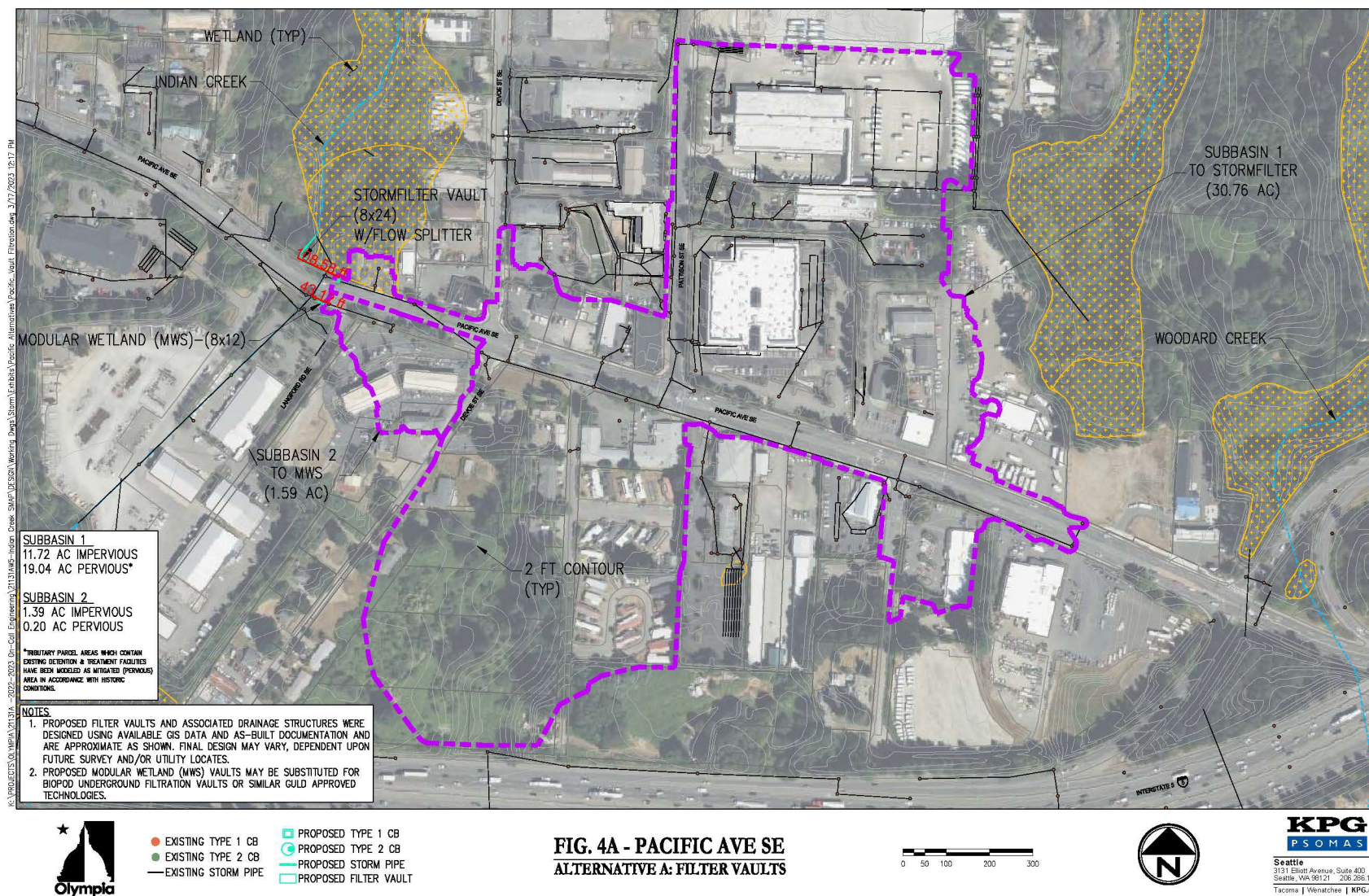
Martin Way East – Alternative A (Bioswales)



Martin Way East – Alternative B (Filter Vaults)



Pacific Avenue Southeast - Alternative A (Filter Vaults)



Quince Street Southeast - Alternative A (Bioswale and Modular Wetland System)

