South Campbell Heights
Environmental Supplement

FOR:

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DOSSIER: 22.0046-001

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South Campbell Heights Environmental Supplement

1 Introduction

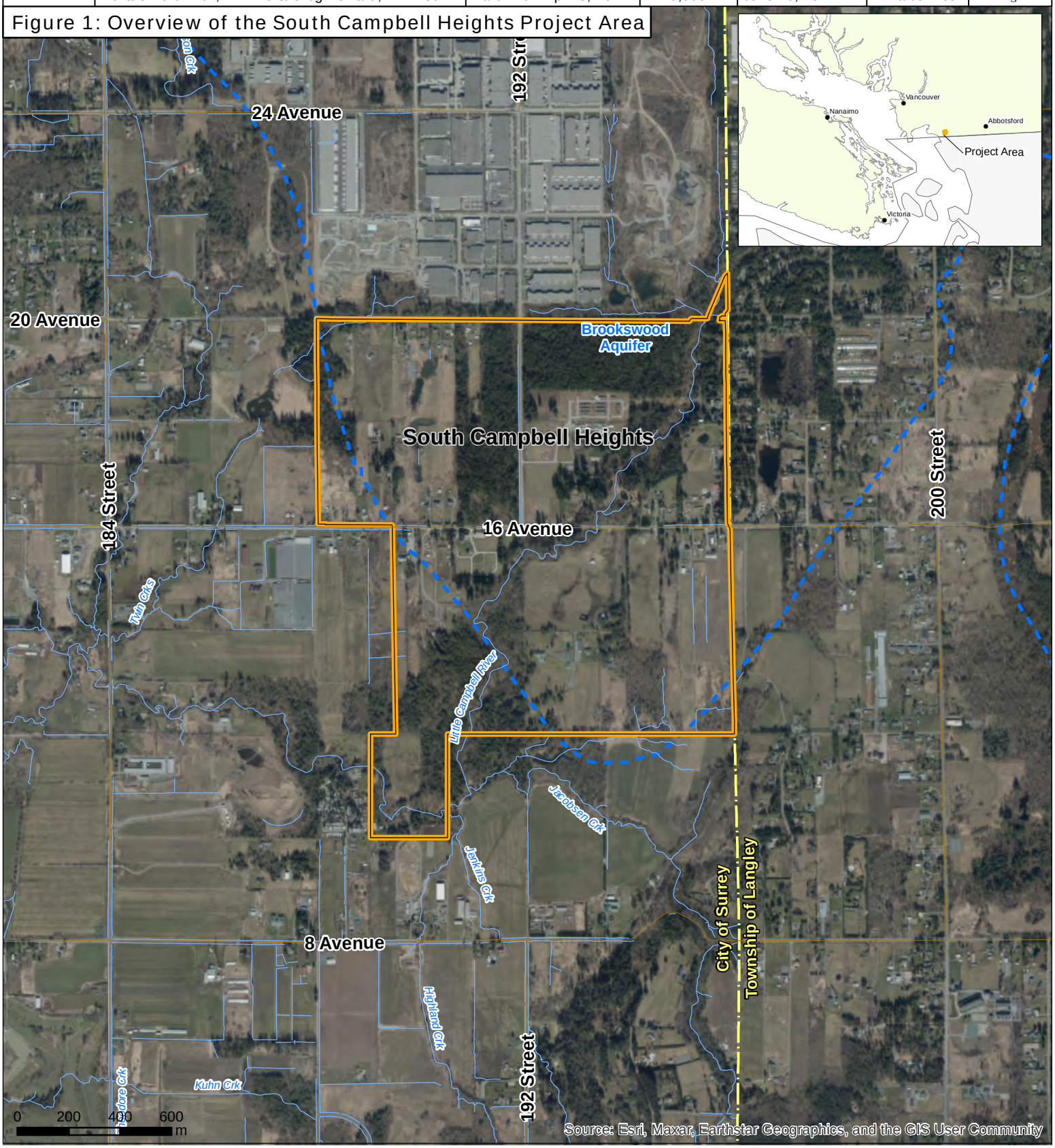
Madrone Environmental Services Ltd. (Madrone) was retained by the City of Surrey to provide guidance on species at risk procedures for future development reviews in the South Campbell Heights (SCH) area, and to update recent environmental assessments in SCH to reflect current conditions and regulatory frameworks. This work is intended to supplement the 2015 Environmental Study completed by Madrone and focuses on ensuring that watercourses and environmental features in the SCH area are addressed through the most current legislative lens. This report is structured to first describe relevant environmental regulations for development in SCH and second to address watercourse and habitat classifications. As relevant legislation is introduced, so too is guidance for navigating this regulatory framework. Subsequently, this report focuses on wetland and stream classification, habitat features for species at risk (SAR), and recommended considerations for environmental protection or restoration during future development within the SCH area. Because the final extent and scope of development is not yet known, and due to the scope of work incorporated in this report, the findings here do not constitute an environmental impact assessment and further survey by a qualified environmental professional (QEP) will be required for all future site-specific development projects within the SCH area. Once development intentions and boundaries are known, a QEP can be retained to assess a proposed development area.

1.1 South Campbell Heights Project Area

The SCH area extends south from 20 Avenue to just before 8th Avenue, and east from 188th Steet to the Surrey-Langley border (196th Street). The SCH is in the southwestern portion of the Brookswood Aquifer (**Figure 1**). The area is bisected by the Little Campbell River and contains portions of East Twin Creek, West Twin Creek, Highland Creek (Hyland Creek), Jacobsen Creek and their associated unnamed tributaries, all of which flow into the Little Campbell River.

MADRONE environmental services ltd	PROJECT: South Campbell Heights Local Area Plan Environmental Consultation		CLIENT: City of Surrey	LOCATION: Surrey, BC	DOSSIER: 22.0046
	ASSESSED BY: Richard Borthwick, R.P. Bio & Greg Howard, R.B. Tech	FIELD VISIT: March 29 - April 5, 2022	MAP SCALE: 1:20,000	MAPPING DATE: June 10, 2022	DRAWN BY: Anna Jeffries

Figure 1: Overview of the South Campbell Heights Project Area



Project Area
Brookswood Aquifer Extent
Surrey/Langley Boundary
Drainage
Road

1.2 Overview of Municipal Planning Context

In 1980, the City of Surrey created the South-East Surrey Local Area Plan (LAP) to provide industrial areas and business parks to generate job opportunities[1] for the people of Surrey. This South-East Surrey LAP contained Campbell Heights and SCH. Plans for Campbell Heights North began in 1999 when Surrey City Council supported a review for the Campbell Heights LAP (Corporate Report R2108). Campbell Heights North is currently in active use and development. The Local Area Plan for South Campbell Heights (**Figure 2**) is currently in Stage 2 of the Plan Review process. **Table 1** summarizes our understanding of the timeline of the SCH LAP up to the publication of this report.

TABLE 1. TIMELINE OF SOUTH CAMPBELL HEIGHTS STAGE 1 DEVELOPMENT

Date	Action Item	Outcome
September 8, 2014	South Campbell Heights Local Area Plan	Initiation
December 1, 2014	South Campbell Heights Local Area Plan Terms of Reference	Approved (City of Surrey Corporate Report No. R19)
June 2015	Madrone Presented Environmental Study Findings for South Campbell Heights	Helped Guide Land Use Process
April 2016 – June 2017	Community Consultations	Guidance on Final Refinement of Stage 1 Land Use
July 2017	Refinement to Stage 1 Land Use Concept	Approved (City of Surrey Corporate Report R171)
May 2018	Initial Official Community Plan (OCP) and RGS Amendment Application Sent to MVRD for Urban Containment Boundary Adjustment	Revised Plans Needed
July 12, 2021	Revised Stage 1 (Draft) Plan	Endorsed (City of Surrey Corporate Report R147)
September 2021	Revised Official Community Plan Amendments and Regional Growth Strategy (RGS) sent to MVRD for Review	Metro Board deliberation on For RGS Amendments
February 14, 2022	City of Surrey Council Discussed MVRD Feedback	Report and Presentations of MVRD Feedback
February 25, 2022	MVRD Board passed and adopted the Metro Vancouver Regional District Regional Growth Strategy Amendment Bylaw No. 1238, 2021	Metro Vancouver Board approves and redesignates Rural lands to Mixed Employment, Conservation and Recreation; extends the Urban Containment Boundary and removes Special Study overlay for South Campbell Heights.
March 7, 2022	Surrey City Council adopted the Official Community Plan (OCP) Bylaw, Amendment Bylaw, 2021, No. 20393, to align the Surrey OCP with the revised Stage 1 Land Use Plan for South Campbell Heights.	South Campbell Heights Local Area Plan process enters Stage 2

[1] Campbell Heights Local Area Plan | City of Surrey

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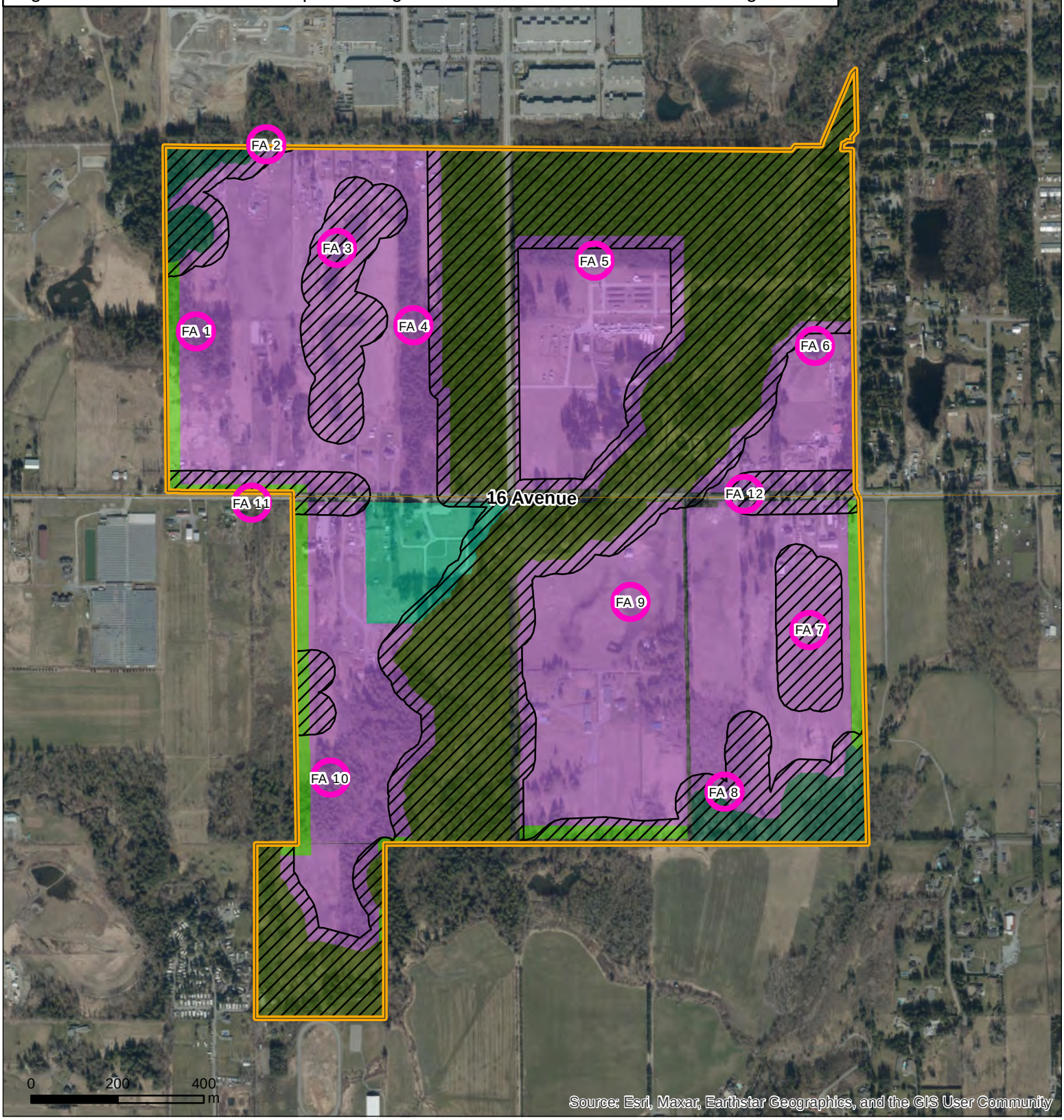
Figure 2: Current South Campbell Heights Local Area Plan Land Use Designations



Project Area

Road

South Campbell Heights Land Use

Business Employment

Biodiversity Preserve

Riparian Area / Conservation

Cemetery

Buffer

Sensitive Ecosystem DPA

FA # Field Assessment Focal Area (Refer to Table 5)

1.3 Semiahmoo First Nation

The SCH area exists on the shared, unceded traditional territory of Semiahmoo, Katzie, Kwantlen, and other Coast Salish Peoples. Continuing engagement with Semiahmoo First Nation (SFN) is a vital component of the proposed SCH area LAP. During this study, Madrone had the opportunity to engage with some members of the SFN, and we are grateful for the dialogue and knowledge shared with us during those meetings and in the field. Madrone worked directly with Don Welsh, historian and archeologist for the SFN, to assess several field assessment Focal Areas, environmental features, and resources of concern. It is our understanding that the rigorous protection of archeological sites, water quality, biodiversity, and ecological features above and beyond SAR were all expressed as high priorities during our meetings and onsite visits. Due to the limited, inventory-focused scope of this study, extensive dialogue with the SFN was not possible and this report does not attempt to articulate or represent the objectives and concerns of the SFN. We understand that a more detailed Cumulative Effects Assessment regarding Traditional Use is expected to be completed by the SFN, which will expand dialogue and input to better address the objectives and concerns of the SFN regarding traditional practices and ecological knowledge in SCH.

1.4 Recent Environmental Assessments and Reports

A Rocha Environmental Stewardship created several reports for the City of Surrey including a watercourse assessment for West Twin Creeks in 2012, a watercourse assessment of Jacobsen Creek in 2013, and more. The Salmon Habitat Restoration Program (SHaRP) completed Sensitive Habitat Inventory Mapping (SHIM) for Twin Creeks East in 2012 and created a list of stewardship opportunities from SHIM for Jacobsen Creek for 2013. In 2015, the City of Surrey retained Madrone to produce an environmental study[2] (including a desktop archaeological overview assessment and groundwater review) to help guide the land use planning process. This study examined surface and groundwater hydrology, species at risk, biodiversity, watercourse classifications, fisheries resources, environmentally sensitive features (e.g., large trees), and archaeology of SCH. Herein, we do not seek to replace these previous reports, rather to supplement the 2015 Madrone study. This supplement includes updated SAR critical habitat mapping and clarity on permitting triggers for SAR assessments during development and updates to watercourse classifications. This supplement is necessitated by the Riparian Areas Regulation replacement by the Riparian Areas Protection Regulation (RAPR), the Water Act replacement by the Water Sustainability Act (WSA),[3] and updates to the federal Fisheries Act including implementation of preventing Harmful Alteration, Disruption or Destruction (HADD) of fish habitat.[4]

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[2] Kremsater, L., Elliot, T., and Hamm, S. 2015. South Campbell Heights Environmental Study #1220-030-2015-008. Prepared for the City of Surrey.

[3] Water Sustainability Act (gov.bc.ca)

[4] Fisheries Act (juctice.gc.ca)

1.5 Purpose

The purpose of this report is to provide high-level guidance for accommodating SAR reviews in-line with the City of Surrey's Sensitive Ecosystem Development Permit (SEDP) Areas and the Federal Species at Risk Act (SARA), and to assess watercourse classification in accordance with updated legislation requirements under the WSA, RAPR and Fisheries Act. In this report we first describe the environmental regulatory frameworks that may apply to development projects within the South Campbell Heights. Next, we provide guidance for navigating this regulatory framework, along with QEP responsibilities. We then describe the methods and results of the watercourse inventory and broad-overview habitat assessment. The report closes with a discussion of results and recommendations.

2 Regulatory Framework

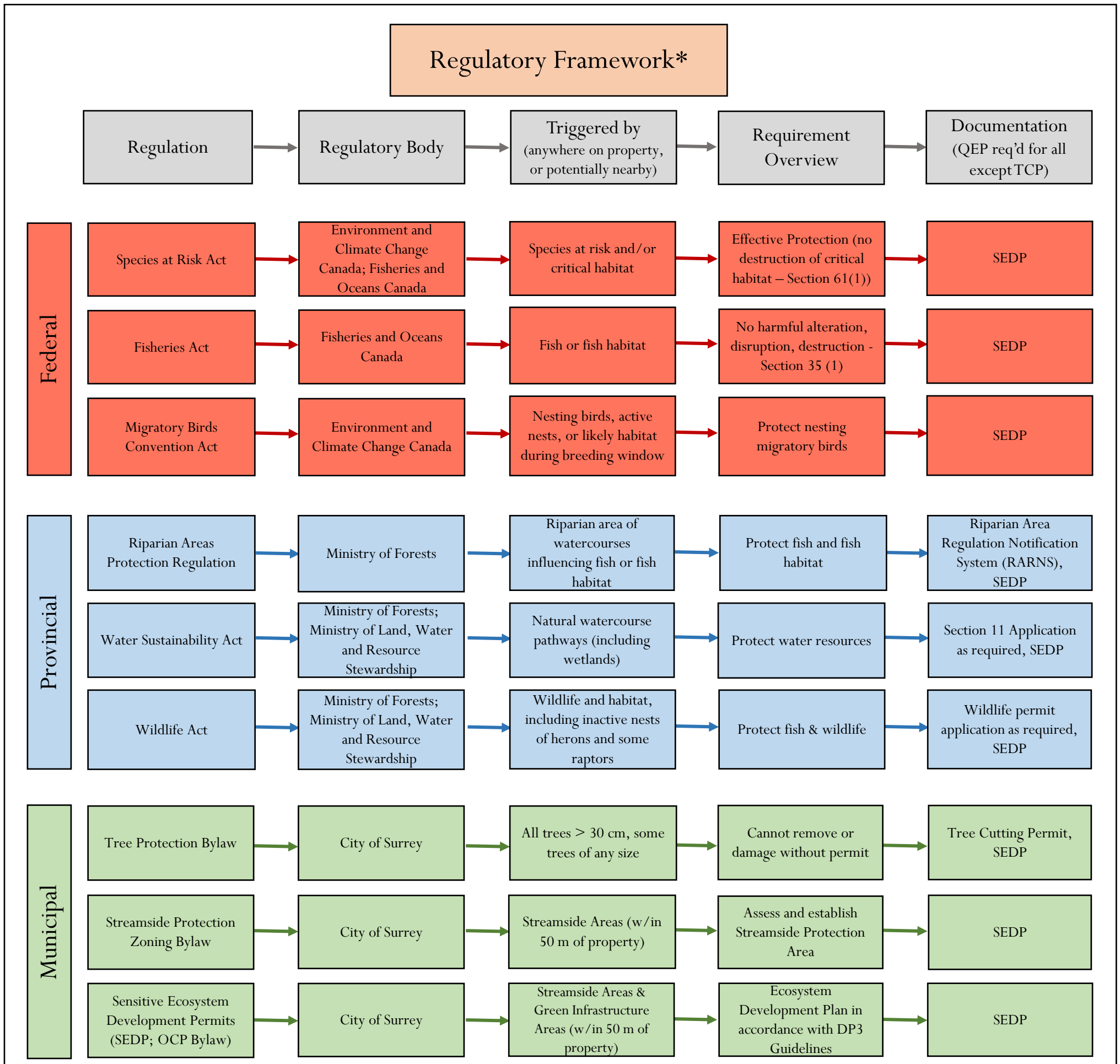
There are many environmental features in the SCH area that are regulated at the federal, provincial, and municipal levels. Before beginning a new development project, it will be necessary to understand which environmental features may influence the development process and which corresponding regulations and recommendations may be relevant. All parcels in the SCH area currently overlap with a Sensitive Ecosystem Development Permit Area (SEDPA), and as such all subdivision, construction, soil disturbance and land disturbance on any portion of any parcel requires QEP assessment and a Sensitive Ecosystem Development Permit (SEDP) from the City of Surrey. Broadly speaking, any development in critical habitat, as legally defined through the Species at Risk Act,[5] or other sensitive ecosystems, as defined locally or provincially, will require a Qualified Environmental Professional (QEP) to assess habitat in a regulatory context and provide development guidelines that align with development permitting requirements, bylaws, and species at risk recovery strategies and management plans.

Below we organize the relevant regulations into federal, provincial, and municipal levels, providing summary details for each regulation and how it may apply to development projects in the SCH area (**Figure 3**). After describing the regulations, Section 3 provides an overview of the process landowners, land managers and QEPs can expect to follow to understand and meet these regulatory requirements.

[5] Species at Risk Act (justice.gc.ca)

Figure 3. Navigating the Regulatory Framework

All construction and site preparation in the SCH will require an SEDP and QEP. Going through the SEDP application process with City of Surrey staff and a QEP can ensure that all of the below regulations are met, along with any other development process requirements.



Note: The list of items in this regulatory framework diagram is not exclusive to all potential permits and requirements that associated with Federal, Provincial, and Municipal approvals but is provided as a guide for convenience purposes. Additional Acts, Regulations and Municipal bylaws and Polices will also apply (For example Other Provincial Acts, ESC Bylaw, Hazard Lands DPAs, Farm Protection DPAs, P-15s, ISMP, etc.).

Find more information about Sensitive Ecosystems DPA submission requirements, development guidelines, and exemptions:

- Sensitive Ecosystems DPA#3 Guidelines
- Sensitive Ecosystem DPA Guide
- Streamside Protection Setback Areas from Part 7A of the Surrey Zoning Bylaw, No. 12000, 1993
- Terms of Reference for DP#3 Application Reviews
- Process Flow Chart for DP#3 Application Reviews
- Qualified Environmental Professional (QEP) Sign-Off Form and Checklist

Review these additional Federal and Provincial websites as they apply for more information.

- Fisheries and Oceans (DFO) Request for Project Review Process
- DFO Standards and Codes of Practice
- Water Sustainability Act (WSA) Change Approval Overview
- WSA Change Approval Online Applications
- Riparian Areas Protection Regulation (RAPR) Technical Assessment Manual (November 2019)
- RAPR Online Notification System (RARNS)
- BC Wildlife Act General Wildlife Permit Guide

Review these Land Development Best Management Practices

- DFO Land Development Guidelines (PDF)
- BC Natural Resource Best Management Practices
- BC Regional Timing Windows

Tips on Species at Risk

Under the Species At Risk Act, no person is allowed to destroy any part of critical habitat of a species at risk (Species at Risk Act Section 61(1)). Currently there is identified critical habitat for three species at risk in the South Campbell Heights*:

- Western Painted Turtle
- Salish Sucker
- Barn Owl [Proposed]

Before undergoing the SEDPA application process, it may be helpful to consult Figure 5 of this report or the City of Surrey Mapping Online System (COSMOS) to see how mapped critical habitat may overlap your area of interest. Species recovery plans (linked in the list above) for the relevant species at risk can then be consulted in order to understand two key pieces of information:

- Habitat features that are considered critical habitat (often referred to as biophysical features)
- Activities likely to result in destruction of critical habitat

A QEP can help interpret how critical habitat may need to be accommodated during future development. The Ecosystem Development Plan will be required to adequately address species at risk before development can begin such that planned development activities can be reasonably expected to not destroy any part of critical habitat, as per each relevant recover strategy.

* A QEP will need to review any updates to this status

2.1 Federal Level

2.1.1 Species At Risk

In Canada, SAR are protected by SARA. SARA establishes Schedule 1, which is the official list of species at risk. Schedule 1 species are classified as extinct, extirpated, endangered, threatened, or special concern. Once listed, measures to protect and recover a species are implemented through federal recovery strategies, action plans or management plans (if special concern). Listed species and identified critical habitat are protected by law.

The Committee on the Status of Endangered Wildlife in Canada[6] (COSEWIC) is the independent science advisory panel responsible for designating wildlife and plant species in danger of disappearing from Canada. Their determination of a species' conservation status provides the basis for SAR listings. Species are designated at risk due to multiple factors, including low population numbers, slow recovery tendencies and other vulnerabilities. Habitat loss due to development and other land use disturbances is a major threat for many SAR. A large proportion of these species require distinct, critical habitat that is necessary for their survival and recovery.

Recovery strategies[7] (or sometimes action plans) are prepared for species listed as threatened or endangered. Recovery strategies often include the mapping and description of the subject species' critical habitat. Species listed as special concern recieve management plans.[8] Management plans differ from recovery strategies in that they do not designate critical habitat.

SARA describes critical habitat as "… *the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species' critical habitat in a recovery strategy or in an action plan for the species.*"

Subsection 61(1) of SARA provides that "*no person shall destroy any part of the critical habitat of a listed endangered or threatened terrestrial species at risk that is on non-federal lands.*" Areas identified as critical habitat, features that are considered critical habitat (often referred to as biophysical attributes) and actions that are "likely to result in the destruction of critical habitat" for SAR can be found in the species' recovery strategy.

While SARA applies to all lands in Canada, critical habitat on non-federal lands is not automatically protected. Instead (under Section 61) it is expected that landowners and land managers (including those that oversee provincial, regional, local government, and private land) will apply approaches that protect

[6] Cosewic / Cosepac - Home

[7] Species at Risk Act: recovery strategies - Canada.ca

[8] Species at Risk Act: management plans - Canada.ca

or effectively protect critical habitat. Effective protection is seen as "*measures and mechanisms that can reasonably be expected to protect critical habitat from alterations that would reasonably be expected to reduce the critical habitat's capacity to provide for the recovery and survival of a species at risk.*[9]" This expectation is corroborated in the proposed policy on critical habitat protection on non-federal lands: 2016,[10] Sections 3.1 and 3.3: "*the protection outcome is that critical habitat is not being and will not be destroyed, except in ways that SARA's discretionary measures would allow…Critical habitat will be considered destroyed if part of the critical habitat is degraded, either permanently or temporarily, such that it would not serve its function when needed by the species. Destruction may result from a single or multiple activities at one point in time or from the cumulative effects of one or more activities over time.*"

The responsibility of landowners and land managers to ensure effective protection can be met through development permit review at the municipal level. Hiring a QEP can be the first step in addressing this responsibility. Development permit review provides a mechanism for regulatory oversight over land management decisions in accordance with Section 61(1) of SARA. To determine whether critical habitat is effectively protected, the federal government uses a four-step process called a Critical Habitat Protection Assessment (CHPA). Where effective protection is not achieved or actions occur to damage or destroy critical habitat on non-federal lands, SARA requires the responsible federal Minister (i.e., Environment and Climate Change Canada) to recommend to the Governor in Council that a protection order (sometimes referred to as a "Safety Net" order) be made to protect critical habitat that remains unprotected. If reasonable steps are underway to protect critical habitat, the Minister can defer the protection order.

Compliance and enforcement for protecting SAR can be complicated as direct and long-term impacts to SAR or critical habitat can be difficult to quantify. However, the identification in recovery strategies of critical habitat, biophysical attributes characteristic of critical habitat, and "*activities likely to result in the destruction of critical habitat*" reduces much of the ambiguity of what constitutes a violation of SARA, and all parties involved in land management (i.e., landowners, QEPs, and local government oversight) have a responsibility to protect or effectively protect SAR and critical habitat. A federal court ruling against a local government and private developer in 2018 (Le Groupe Maison Candiac Inc. v Canada), has set the precedent that development and use of land can be restricted based on the presence of SAR.[11]

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[9] Species at Risk Act: Program Guidance A Guide to the Critical Habitat Provisions of the Species at Risk Act. November 2004

[10] Proposed policy on critical habitat protection on non-federal lands: 2016 - Canada.ca

[11] Supreme Court of Canada - SCC Case Information - Summary - 39272 (scc-csc.ca)

2.1.2 Fisheries Act

The Fisheries Act[12] provides federal protection to fish and fish habitat by conservation and pollution prevention measures. More commonly, the regulations surrounding protection of fish and fish habitat are encompassed by the provincial water management legislation including the WSA and RAPR.

In August 2019, Bill C-68 amended the Fisheries Act to provide provisions to protect fish and fish habitat that were previously regarded as inadequate and convoluted, and only applied to specific habitats that occurred in commercial, recreational, or Aboriginal fisheries. In the modernized Fisheries Act, all fish, and their direct and indirect habitat, regardless of its location, are granted legal protection within Canada and are to be protected from the "harmful alteration, disruption, or destruction of fish habitat."

In most instances, using the riparian protection measures stipulated through the City of Surrey's Zoning Bylaw (see Section 2.3.2.1) will help ensure development plans proceed in accordance with the Federal Fisheries Act. Site specific guidance should be determined by a QEP.

2.1.3 Migratory Birds Convention Act

The Migratory Birds Convention Act[13] (MBCA) is a federal Act that provides legal protection to over 400 bird species in Canada. This framework is to ensure the protection of migratory birds, nests, and their eggs, as well as provide guidance on regulatory permits and policies regarding development in areas where birds protected under the MBCA may reside. Development processes are required to avoid disturbing active nests. Due to the cryptic nature of nesting site selection, any clearing of vegetation through the breeding bird window poses a potential risk to nesting birds, their nests, eggs, or chicks. Consequently, guidance on clearing timing should be provided by a QEP.

2.2 Provincial Level

2.2.1 Wildlife Act

Species and ecosystems at risk (animals and plants) are also ranked at the provincial level. The BC Conservation Data Centre ranks species and ecosystems at risk with respect to their global risk level and assigns provincial risk levels as 'red' and 'blue' lists.[14] However, red and blue lists do not afford legal protection.

[12] Fisheries Act (justice.gc.ca)

[13] Migratory Birds Convention Act, 1994 (justice.gc.ca)

[14] Red, Blue & Yellow Lists - Province of British Columbia (gov.bc.ca)

The Provincial act with most relevance is the BC Wildlife Act (BCWA)[15] which covers the majority of native (and some non-native) species in BC, and extends species lists to locally at-risk populations that may not be protected under SARA. Under this Act, it is unlawful to disturb, harm, molest, take, or destroy wildlife species or their respective habitats. Exemptions occur in the form of permits and licenses, as is the case for hunting and fishing. Additionally, the BCWA provides protections for most bird species in the province, extending similar protections from the MBCA to include most non-migratory birds and their nests, including active and non-active nests of herons and some raptor species. See the Develop with Care 2014 guidelines for further information.[16]

2.2.2 Riparian Areas Protection Regulation

The RAPR[17] outlines protective measures for development throughout riparian areas to ensure assessments are based on scientific methodology applied by a QEP and in the interests of fish and fish habitat. Riparian areas are the areas adjacent to a watercourse, which may include streams, lakes, or wetlands. The protective measures for development are employed to conserve and enhance the riparian area of watercourses pertaining to fish and fish habitat.

Prior to November 1, 2019, the RAPR was known as the RAR. Since the amendments to RAR, there have been changes in the regulation as summarized below:

- Ability for the Ministry of Forests to approve/reject reports based on methodology performed.
- Methods to manage situations of "Undue Hardship."
- Clarification of definitions of terminology applied in the RAPR assessment, such as "stream boundary," "active floodplain," and "top of bank."
- Imposed 5-year lifespan of validity on accepted RAPR reports.
- Mandatory RAPR training for all QEP's to be determined qualified to complete RAPR assessments.
- Online submission system now available for applicants.

RAPR defines a "stream" as: "a watercourse or body of water, whether or not usually containing water and any type of ditch (whether or not usually contain water), a spring (whether or not usually containing

[15] Wildlife Act - Province of British Columbia (gov.bc.ca)

[16] Develop with Care 2014 - Province of British Columbia (gov.bc.ca)

[17] BC Reg 178/2019 | Riparian Areas Protection Regulation | CanLII

water) or a wetland that is connected by surface flow to watercourses or a body of water that provides fish habitat or are connected to surface flow to a fish bearing watercourse or wetland." Streamside setback areas provisioned in the City of Surrey's Streamside Protection Zoning Bylaw (see Section 2.3.2.1) are usually equal to or more conservative[18] than streamside protection and enhancement areas set by RAPR, addressing the Province's "meet or beat" compliance requirement.

2.2.3 Water Sustainability Act

The Water Sustainability Act[19] (WSA) is the provincial legal framework for managing the diversion and use of water resources in BC with the intent to preserve water quality and aquatic resources for human and wildlife use. Natural watercourse pathways are provided legal protection under the WSA, which establishes penalties for non-compliance, including the introduction of deleterious substances into a watercourse.

The WSA replaced the Water Act in February 2016, and incorporated changes including the implementation of new regulations such as the Water Sustainability Regulation, which stipulates the permitting process for work occurring in and about a stream. The WSA provides a revised framework on water use in the province and outlines stronger protection for aquatic ecosystems through the new licensing process for groundwater use and instream works. Licensing support, if required, should be carried out with a QEP.

The WSA defines a "stream" as "a natural watercourse, including a natural glacier course, or a natural body of water, whether or not the stream channel of the stream has been modified, or a natural source of water supply, including, without limitation, a lake, pond, river, creek, spring, ravine, gulch, wetland, or glacier, whether or not usually containing water, including ice, but does not include an aquifer." Wetlands are defined as swamp, marsh, fen, or prescribed features. A QEP is responsible for determining if there are any natural watercourses affected by on-site activities that are not protected by other regulations (such as RAPR), and for providing guidelines for on-site activities to comply with WSA. In SCH this can be accounted for in the SEDP process (see Section 2.3.2).

2.3 Municipal Level

2.3.1 Tree Protection Bylaw

In the City of Surrey, trees over 30 cm in diameter at breast height can only be removed or re-topped with a Tree Cutting Permit (TCP). Permits are also required for any trees planted as a requirement of

[18] In a case where RAPR streamside protection and enhancement areas differ from streamside setbacks provisioned in the Streamside Protection Zoning Bylaw, the most conservative setback must be followed.

[19] Water Sustainability Act - Province of British Columbia (gov.bc.ca)

replacement or development, regardless of size, as are trees of certain species. As such, it is recommended to check with City of Surrey website and staff before removing trees. A QEP may not be required during the permitting process if 4 or fewer trees are to be removed.

2.3.2 Sensitive Ecosystem Development Permit Areas

Streamside Areas and Green Infrastructure Areas (expanded below) make up the SEDPA. An SEDP is required for all subdivision, construction, soil disturbance and land disturbance that takes place on a parcel of property where any portion of the property overlaps with an SEDPA. The SEDPA can be seen on the City of Surrey Mapping Online System (COSMOS),[20] though City of Surrey staff may have access to unpublished updates. All current properties in the SCH area overlap with the SEDPA, and so any subdivision, construction or land disturbance within SCH will require assessment by at least one QEP and approval from the City of Surrey before work can begin.

Detailed information describing the requirements for an SEDP are provided in the City of Surrey's "Development Permit – Sensitive Ecosystem" document[21] and the "DP3 Development Permit Guidelines: Sensitive Ecosystems" document.[22] Main components of the SEDP application include reviewing and considering development restrictions and guidelines, submitting an Ecosystem Development Plan (EDP), and submitting an Impact and Mitigation Plan (if required). A complete EDP identifies a broad spectrum of environmentally sensitive features on and off site that could be affected by development, as well as how these features will be impacted and protected. It is the responsibility of the landowner, QEPs, and the City of Surrey to ensure that all identified environmental features are protected such that relevant federal, provincial, and municipal regulations are met.

2.3.2.1 Streamside Protection

Streamside Protection outlined in Part 7A of the City of Surrey Zoning Bylaw 12000[23] indicates that "*the area of land between the stream and top of bank and the streamside setback area, are subject to the regulations set out in this Part (7A), except for those lands and uses permitted in the Agricultural Land Reserve that are exempt from the Municipal Riparian Area Regulation*."

Streamside Areas, or areas within 50 m of a watercourses on a subject property, are part of the SEDPA and require assessment by a QEP. The SEDP Ecosystem Development Plan and a RAPR Detailed Assessment will specify a Streamside Protection and Enhancement Area (SPEA) setback for the

[20] COSMOS (surrey.ca)

[21] Sensitive Ecosystem Development Permit Area (SEDPA) Facts (surrey.ca)

[22] DP3 Sensitive Ecosystems (surrey.ca)

[23] City of Surrey Zoning Bylaw

watercourse. Part 7A stipulates that where RAPR SPEAs differ from Streamside Protection Areas (SPA) provisioned in the Streamside Protection Zoning Bylaw, the most conservative setback must be followed.

The City of Surrey Zoning By-law, 1993, No. 1200: Part A defines streams in accordance with the WSA and RAPR. In this context, a "stream" includes any watercourse (e.g., pond, river, wetland, gulch, ditch, natural or channelized stream). City of Surrey stream classification follows a color-coded system as outlined below[24]:

- Class A (red): Inhabited by fish year round or potentially inhabited by fish year round. Considered 'streams' as defined by the Provincial Water Sustainability Act and Riparian Areas Protection Regulation. Considered fish habitat as defined by the Federal Fisheries Act.

- Class AO (red dashed): Inhabited by fish primarily during the over-wintering period or potentially inhabited by fish during the over-wintering period with access enhancement. Considered a 'stream' as defined by the Provincial Water Sustainability Act and Riparian Areas Protection Regulation. Considered fish habitat as defined by the Federal Fisheries Act.

- Class B (yellow): Provides food/nutrient value to downstream fish habitat. No fish potential present at any time of the year. Considered a 'stream' as defined by the Provincial Water Sustainability Act and Riparian Areas Protection Regulation. Considered fish habitat as defined by the Federal Fisheries Act.

- Class C (green): A water feature that is not considered a 'stream' as defined by the Provincial Water Sustainability Act and Riparian Areas Protection Regulation. Not considered fish habitat as defined by the Federal Fisheries Act. No fish potential present at any time of the year.

Though resources exist to view watercourse classifications in the City of Surrey,[25] stream classifications may be inaccurate or out of date and should be confirmed by a QEP prior to submission of any development permit applications. Updates to watercourse classifications on some SCH watercourses are included in Section 5.1 of this report, but follow-up assessment will be required during the permitting process.

2.3.2.2 Green Infrastructure Areas

Green Infrastructure Areas represent the Green Infrastructure Network (GIN) and Biodiversity Management Areas identified in Surrey's Biodiversity Conservation Strategy. The Green Infrastructure

[24] City of Surrey – Construction Over or Near Watercourses

[25] Fish | City of Surrey

Area is protected by the OCP bylaw. "Theme D: Ecosystems[26]" of Surrey's OCP sets out the following objectives:

1) Identify, protect, enhance, and manage Surrey's biodiversity and network of significant natural ecosystems.

2) Reduce exposure to natural hazards through the appropriate location and design of development.

3) Encourage and implement greener development and building practices to improve water, air, soil, and habitat quality.

4) Design a community that is energy-efficient, reduces carbon emissions, and adapts to a changing climate.

Section D1 focuses on Green Infrastructure and Ecosystem Management. As described in the OCP, the GIN is an interconnected network "*made up of natural elements that exist at a site, neighbourhood, community, or regional scale. The GIN is a natural interconnected network that conserves natural ecosystem values and functions and that sustains clean air and water. The GIN provides a wide array of benefits to people and wildlife and helps the City of Surrey establish priorities for environmental management*." Key ecological components of the GIN are large core habitats ("Hubs"), connecting "Corridors," and unique ecosystem "Sites".

3 Navigating the Regulatory Framework and QEP Responsibilities

As stated at the beginning of Section 2, all parcels in the SCH area currently overlap an SEDPA, and as such all proposed developments, including subdivision and land or soil disturbance on any portion of a parcel in SCH requires QEP assessment and an SEDP from the City of Surrey. Additionally, removal of trees of any size may require a TCP, and the Tree Protection Bylaw must be followed. As such, it is advised to discuss any construction, watercourse disturbance, soil disturbance, or vegetation removal with City of Surrey staff and/or a QEP as early as possible in the development planning process.

COSMOS is a helpful tool for beginning to understand how critical habitat, Streamside Areas, or Green Infrastructure Areas may influence development on a property. Here you can navigate to the layer list and open the "Land Use / Environment" folder to find mapped SAR critical habitat, as well as Development Permit Areas. Clicking on the relevant check boxes will show which of these areas may overlap with a given property. It is important to note, however, that COSMOS is not necessarily up-to-

[26] City of Surrey – Theme "D" – Ecosystems

date, and the occurrence of DPAs, stream classifications, and critical habitat should be confirmed with City of Surrey staff and a QEP.

The SEDP application process provides an opportunity for landowners, QEPs, and the City of Surrey to ensure that development proceeds in accordance with each of the environmental regulations outlined in this report. This is because the components of the SEDP application process[27] involve identifying SAR, streams, wildlife habitat, bird habitat, site drainage conditions, trees, and vegetation. Once these features are identified, QEPs and City of Surrey staff can ensure that the EDP meets the standards of the regulations outlined in this report, as well as the guidelines outlined in the SEDP guidance documents. Other regulations and permitting processes may apply, and these can best be understood through discussion with City of Surrey staff.

During the SEDP application process, a QEP is required to determine whether sensitive ecosystem features are present on a property, identify those features, and develop an EDP to meet DP3 Sensitive Ecosystems Development Permit Guidelines. Recommendations and guidance will be tailored to the sensitive ecosystem features observed on site. These may include addressing potential impacts to Schedule 1 species and critical habitat in addition to fisheries habitat values and riparian protections, GIN protections, watercourse and wetland protections under WSA, migratory bird protections, wildlife protections and all other relevant guidelines and regulations.

QEPs have a legal due diligence responsibility to ensure they have the requisite skills and expertise, and that they employ appropriate assessment practices when surveying areas likely to contain Schedule 1 SAR and/or critical habitat. In all development instances, it is the QEP's responsibility to work with landowners, regulators, and the City of Surrey to ensure that the EDP adequately identifies, addresses, and reviews likely SAR and critical habitat (see Section 4.2.1), and that subsequent development does not destroy critical habitat or any part of critical habitat. Critical habitat, biophysical features, and actions likely to result in the destruction of critical habitat are clearly identified for each species in the relevant recovery strategies and action plans, and these documents should be consulted and referenced. **Table 2** below includes brief examples of actions likely to result in the destruction of critical habitat for the three SAR with currently identified critical habitat in SCH.

[27] DP3 Development Permit Guidelines: Sensitive Ecosystems

TABLE 2: EXAMPLES OF ACTIVITIES LIKELY TO RESULT IN THE DESTRUCTION OF CRITICAL HABITAT FOR THE THREE SPECIES AT RISK WITH IDENTIFIED CRITICAL HABITAT IN THE SOUTH CAMPBELL HEIGHTS AREA (NOT EXHAUSTIVE)

Species at risk (with critical habitat identified in SCH)	Examples of activities likely to result in the destruction of critical habitat. More examples and details can be found in the species' recovery strategies.
Salish Sucker[28]	"Urban storm drainage"
	"Excessive water withdrawal"
Western Painted Turtle[29]	"Land conversion for residential, commercial, agricultural, recreational, or industrial development."
Barn Owl[30]	"Land conversion for human development within an identified or estimated home range area"
	"Conversion and/or fragmentation of land to road development"

Further guidance regarding candidate critical habitat should be sought from recovery team members,[31] as newly identified occurrences of SAR can initiate expansion of identified critical habitat. Communication with recovery team members can also assist in provide guidance to the QEP regarding the impacts of proposed activities on critical habitat. If impacts are anticipated to SAR and/or critical habitat, and these impacts are not adequately identified, addressed, and reviewed, development may be delayed or not permitted.

Beyond SAR, a detailed assessment by a QEP will be required to understand which wetlands, ponds, or streams may occur on or near a parcel, and which setbacks and mitigation/compensation will be required under RAPR, WSA, and the Streamside Protection Zoning Bylaw. In general, effort to accommodate these features can be minimized by keeping development at least 30 m away from fish-bearing watercourses, and by avoiding development that impacts wetlands. It will also be necessary to check with the City of Surrey to see how the proposed development will integrate with the integrated stormwater management plan (ISMP), and to see if future ISMP works will influence the location or classification of any watercourses on or near the property.

While addressing the DP3 Development Permit Guidelines related to SPAs and Green Infrastructure Areas, a QEP will also be able to assess non-SARA wildlife and wildlife habitat in the legal context of the Wildlife Act and the Migratory Birds Convention Act. These assessments will require a field survey, and the EDP will need to provide mitigation and management measures that align with the provincial Develop with Care guidelines. All development must also comply with the MBCA, which requires that development activities not disturb breeding birds or their nests. Breeding bird surveys will be required

[28] Salish sucker (Catostomus): recovery strategy - Canada.ca

[29] Western Painted Turtle (Chrysemys picta bellii) Pacific Coast population: recovery strategy 2021 - Canada.ca

[30] Barn Owl (Tyto alba): recovery strategy, western population, proposed 2021 - Canada.ca

[31] Contact species at risk recovery team chairs - Canada.ca

for vegetation clearing during the breeding period (approximately late March through mid-August), and activity causing disturbance to breeding birds must be halted until the nest area is no longer active.

4 Methods

4.1 Watercourse Assessment Desktop Review

Madrone used a 2016 1-metre-resolution LiDAR derived Digital Elevation Model[32] (DEM) to support and understand field assessments of watercourses within the SCH (**Figure 4**). Examples of features visible in the DEM are areas of historic sediment extraction. This extraction has altered surface flows, and in some cases appears to have exposed the water table. The DEM was used along with the City of Surrey watercourse class ratings to identify areas for field assessment to confirm or refine watercourse existence, classification, and connectivity to other watercourses, focusing on watercourses indicated by City of Surrey as needing further review.

[32] Contact species at risk recovery team chairs - Canada.ca (arcgis.com)

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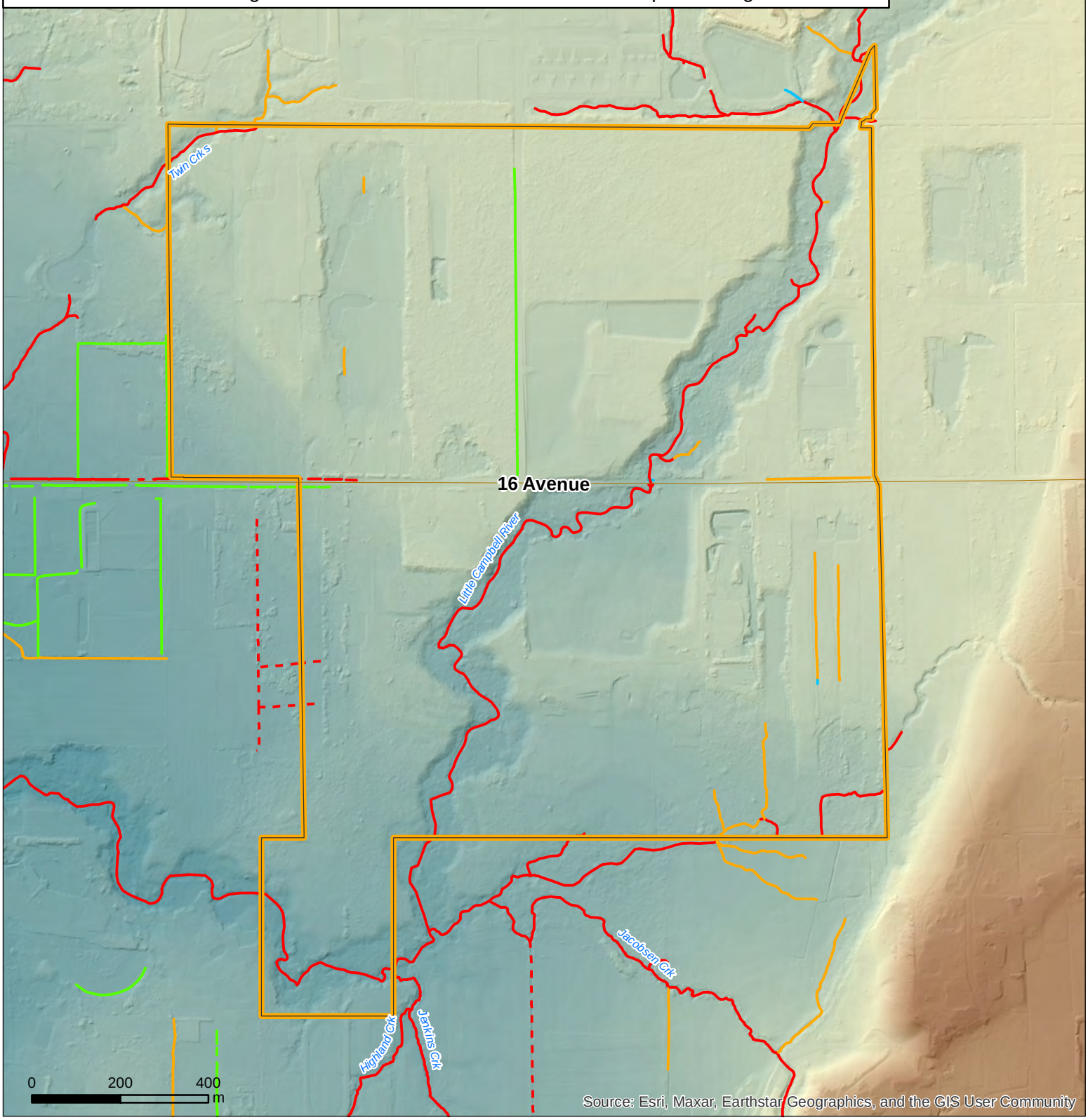
Figure 4: City of Surrey Stream Classifications Prior to Field Assessment, Overlaying 2016 1m Resolution Digital Elevation Model of the South Campbell Heights Area.



Project Area
Road

Fish Classifications

A
AO
B
C
Unknown

DEM

High : 90m
Low: 9m

4.2 Species of Interest and Key Habitat Features Desktop Review

4.2.1 Species at Risk

The 2015 Madrone report provides a preliminary list of SAR potentially found within SCH. This list was narrowed down in 2022 using COSMOS, iNaturalist, E-Bird, the species at risk public registry,[33] and discussion with City of Surrey staff to produce a list of SAR most likely to occur within SCH (**Table 3**). Currently, there are three SAR with critical habitat mapped within SCH: the Salish Sucker, Western Painted Turtle, and Barn Owl (see **Figure 5**). This status could change with the identification of new species occurrences, and as recovery strategies and action plans are updated.

Table 3 also includes some SAR which have suitable habitat within SCH as well as nearby critical habitat, but do not have documented occurrences within SCH. For example, the Pacific Water Shrew is found within 5 km and favour habitat conditions found within SCH. Additionally, as 2015 Madrone report indicates, there are several small wildlife species (such as bats) which are difficult to assess but could occur in SCH. This limitation is ongoing, and as such the list of species identified in **Table 3** should not be considered exhaustive.

[33] Species at risk public registry - Canada.ca

TABLE 3: CONFIRMED AND POTENTIAL SPECIES AT RISK IN SOUTH CAMPBELL HEIGHTS

Species at Risk (status)	Presence	Recovery Strategy or Management Plan [34]
Invertebrates		
Dun Skipper (threatened)	Not recorded, but critical habitat mapped within 20 km	Recovery Strategy
Oregon Forestsnail (endangered)	Not recorded, but critical habitat mapped within 20 km	Recovery Strategy
Reptiles and Amphibians		
Red-legged Frog (special concern)	Present	Management Plan
Western Toad (special concern)	Present	Management Plan
Western Painted Turtle (threatened)	Critical Habitat mapped in SCH	Recovery Strategy
Fish		
Salish Sucker (threatened)	Critical Habitat mapped in SCH	Recovery Strategy
Birds		
Band-tailed Pigeon (special concern)	Present	Management Plan
Barn Owl (Threatened)	Critical Habitat mapped in SCH	Recovery Strategy
Barn Swallow (status under review)	Present	Neither
Great Blue Heron fanninni (special concern)	Present	Management Plan
Olive-sided Flycatcher (threatened)	Present, critical habitat not yet mapped	Recovery Strategy
Mammals		
Pacific Water Shrew (endangered)	Not recorded, but critical habitat mapped within 20 km	Recovery Strategy

[34] Recovery documents - Province of British Columbia (gov.bc.ca)

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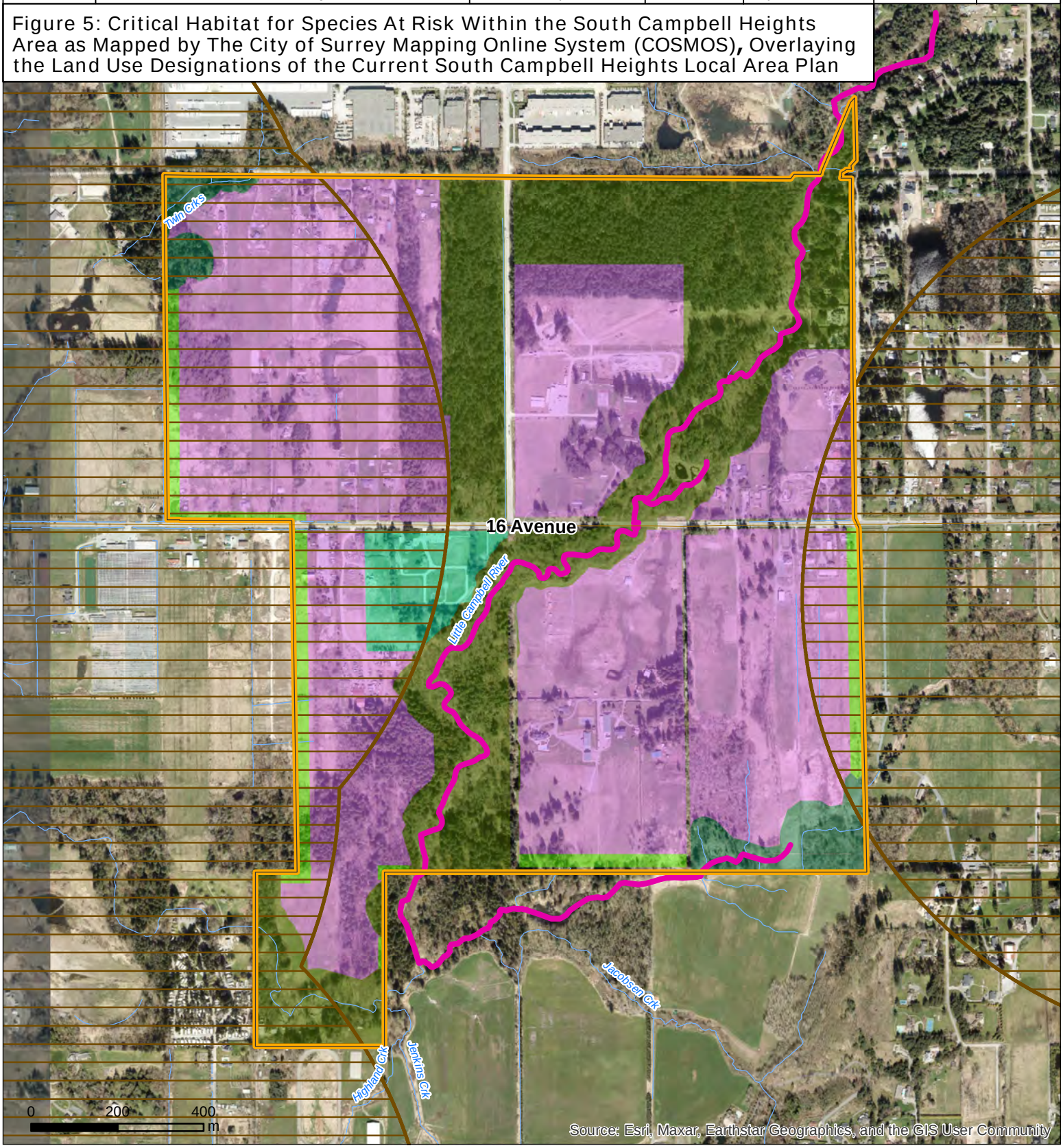
Figure 5: Critical Habitat for Species At Risk Within the South Campbell Heights Area as Mapped by The City of Surrey Mapping Online System (COSMOS), Overlaying the Land Use Designations of the Current South Campbell Heights Local Area Plan



- Project Area
- Road
- Drainage
- Salish Sucker Critical Habitat
- Western Painted Turtle Pacific Coast population Critical Habitat
- Barn Owl Critical Habitat
- Business Employment
- Biodiversity Preserve
- Riparian Area / Conservation
- Cemetery
- Buffer

4.2.2 Species of Interest

From **Table 3** we refined a list of focal species that represent the diversity of habitat needs for SAR across SCH (**Table 4**). These include the three Schedule 1 SAR with identified critical habitat within SCH, as well as one SAR with the potential for future designation of critical habitat in SCH: the Pacific Water Shrew. We also included one species without Schedule 1 status, the Columbian Black-tailed Deer. Black-tailed Deer is included in the list of species of interest because they are the only large mammal indicator species in Surrey's Biodiversity Conservation Strategy.[35] Key habitat features for species of interest were derived from the species recovery strategies and BC Species & Ecosystems Explorer.[36]

TABLE 4: COMPILED LIST OF SPECIES OF INTEREST IN SOUTH CAMPBELL HEIGHTS AND THEIR KEY HABITAT FEATURES

Common Name	Scientific Name	Justification	Key habitat features
Barn Owl	Tyto alba	CH mapped in SCH	Meadows and fields for hunting. Old barns, other similar structures and trees with large cavities for nesting.
Columbian Black-tailed Deer	Odocoileus hemionus	BCS indicator species (not a SAR); present in SCH37	Generalists that thrive with habitat connectivity and close association of cover (mature forests, thick brush) and foraging areas (forested wetlands, riparian areas, fields, young forest, mature or old-growth forest)
Pacific Water Shrew	Sorex bendirii	CH mapped nearby, potential for future identification of critical habitat in SCH	Mature forested riparian areas at least 100 m per side of watercourse. Slow moving streams and wetlands. Large downed trees for cover. Vegetated understory and dispersal corridors between foraging areas and nest sites.
Salish Sucker	Catostomus sp.	CH maped in SCH	Streams with gravel bars, riffle areas, pools with minimum depth of 70cm, and few to no additional sediment, nutrients, or toxins in water.
Western Painted Turtle	Chrysemys picta bellii	CH mapped in SCH	Ponds, wetlands, and streams with floating or emergent large logs/rocks. Nearby sandy or gravelly soil. Require safe dispersal corridors (low to no road densities) over long distances between aquatic habitats.

4.2.2.1 Barn Owl

Barn Owls use a variety of habitat types that include agricultural fields, forests, grasslands, riparian areas, wetlands, and buildings.[38] Barn Owls forage in dense grassy areas, and occasionally in wetland areas, where rodents are likely to be found. They choose human-made structures for nesting sites and can be found in abandoned buildings, barns, and silos. If not using human-made structures for nesting, Barn Owls use hollowed tree cavities, old hawk nests, and areas along riverbanks. Much of the western portion and some of the eastern portion of the SCH area falls within proposed Barn Owl critical habitat.

[35] Surrey_Biodiversity_Conservation_Strategy_Report

[36] BC Species & Ecosystems Explorer - Province of British Columbia (gov.bc.ca)

[37] As confirmed from iNaturalist, as well as tracks and sign during fieldwork for this report

[38] Species Summary (gov.bc.ca)

4.2.2.2 Columbian Black-tailed Deer

Columbian Black-tailed Deer are generalists that can occupy many different types of habitat, however, they require dispersal corridors for foraging, breeding, and fawning needs across their range. Black-tailed Deer have been observed using agriculture fields, residential areas, mixed forests, grasslands, estuaries, riparian areas, and wetlands.[39] Columbian Black-tailed Deer are not a SARA-listed species, but are protected under the BC Wildlife Act. As the only large mammal indicator species for Surrey's Biodiversity Conservation Strategy, they are an integral part of Surrey's natural areas. In Surrey, their range appears to be contracting to less developed, less fragmented parts of the City: South/southeast Surrey and the areas along the Langley and US borders are becoming an important refuge for remaining populations.[40]

4.2.2.3 Pacific Water Shrew

The Pacific Water Shrew is a diving shrew that specializes in forested riparian and wetland habitats. Associated vegetation includes western redcedar, skunk cabbage and red alder.[41] Important habitat features for the Pacific Water Shrew include dense forested (deciduous and coniferous) riparian and wetland habitats for foraging and large downed wood for nesting.[42] Maintaining and restoring habitat connectivity (with appropriate vegetative cover and through mitigating road crossings), and minimizing pollution from pavement and landscaping runoff are considered important for sustaining and enhancing population health.

4.2.2.4 Salish Sucker

The Salish Sucker is restricted to extreme southwest B.C. Once thought extirpated from the Little Campbell River, populations were rediscovered over the last decade in and around the A Rocha/Brooksdale section of the river.[43] Salish Suckers are associated with streams that are more than 50 m of continuous length and have pools that are more than 70 cm depth in the summer low flows. Habitat requirements for Salish Suckers include little or no additional sediment, nutrients, or toxins. Almost all sections of the Little Campbell River within the SCH area are critical habitat for Salish Sucker.

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[39] Species Summary (gov.bc.ca)

[40] Pamela Zevit, City of Surrey Biodiversity Conservation Planner, personal communication

[41] Species Summary (gov.bc.ca)

[42] Pacific water shrew (Sorex bendirii): recovery strategy 2014 - Canada.ca

[43] Salish Sucker - A Rocha

4.2.2.5 Western Painted Turtle

The recovery strategy for the Western Painted Turtle identifies habitat for foraging, nesting, and dispersal as essential for maintaining and enhancing stable populations of Western Painted Turtle. [44] Foraging habitat consists of ponds and slow-moving streams. Nesting habitat consists of gravelly, sandy beaches or upslope embankments. Vegetated connectivity corridors are considered important for dispersal. Inability to safely disperse is considered a critical limiting factor for Western Painted Turtle, and reducing road mortality by providing safe vegetated corridors and adequate road crossings (via large strategically placed wet or dry culverts) among nesting, foraging, and rearing habitat is important.

4.2.3 Key Habitat Features

Key habitat features that meet many of the requirements of the above species of interest are as follows:

- Large diameter, mature mixed forests with standing or downed dead wood for nesting, roosting, perching, foraging, and security. Big trees (living and dead) are also a major foundational component of coastal forest food webs, sustaining diverse populations of invertebrates and fungi, which in turn act as essential food sources for other animals.

- Intact, mature forested buffers around streams, wetlands, and ponds for improved water quality, foraging sites, nesting/rearing sites, and dispersal.

- Wide, intact vegetated connectivity corridors with minimal disturbance between key habitat features (e.g., nesting, spawning, rearing and foraging sites), supplemented by wildlife compatible road crossings (e.g., oversized wet or dry culverts).

- A mosaic of intact upland and riparian forested areas with edge and open areas (e.g., shrub thickets, meadows, and old-field areas) to provide cover and areas for browsing, foraging, and hunting. This is especially important for Barn Owls and deer.

While these features are essential for the identified SAR and other species of interest in SCH, they also support biodiversity and human well-being in ways that align with the City of Surrey Official Community Plan. These features support biodiversity beyond the SCH by creating ideal habitat conditions for other wildlife and SAR, migratory and non-migratory birds, and downstream aquatic, intertidal, and marine species. These ecosystem features in turn benefit the well-being of people who depend on these natural systems for mental health, recreation, social connection, spirituality, cultural vitality, and nourishment.

[44] Western Painted Turtle (Chrysemys picta bellii) Pacific Coast population: recovery strategy 2021 - Canada.ca

In SCH they are particularly important, as these resources are diminishing in the face of development and becoming increasingly limited on the landscape.

4.2.4 Focal Areas for Field Assessment

Based on desktop reviews and input from the City of Surrey, Madrone selected 12 focal areas for field assessment (**Table 5**, **Figure 2**).

TABLE 5: FOCAL AREAS FOR FIELD ASSESSMENT AND FEATURES OF INTEREST

Focal Area	Land use classification under proposed South Campbell Heights LAP	Primary features to assess
FA 1	Business Employment/Buffer	Investigate forested area for potential watercourses and SAR habitat.
FA 2	Sensitive Ecosystem DPA	Determine status of connectivity between watercourses.
FA 3	Business Employment/Sensitive Ecosystem DPA	Examine connectivity of water flow and habitat quality in and around ponds.
FA 4	Business Employment	Investigate quality of habitat of western edge of forest stand, which is excluded from the biodiversity preserve and sensitive ecosystem DPA but included in the GIN. Also investigate pond and habitat features at center of mapped critical habitat for Western Painted Turtle.
FA 5	Business Employment/Sensitive Ecosystem DPA	Examine habitat quality and windthrow impacts of southern edge of forest stand, which is excluded from the biodiversity preserve and sensitive ecosystem DPA but included in the GIN.
FA 6	Business Employment/Sensitive Ecosystem DPA	Examine connectivity of water flow and habitat quality in and around ponds.
FA 7	Business Employment/Sensitive Ecosystem DPA	Refine classification of watercourses and determine connectivity with nearby watercourses.
FA 8	Business Employment/Sensitive Ecosystem DPA/Biodiversity Preserve	Confirmation of watercourse classification.
FA 9	Business Employment	Investigate potential wetlands and watercourses.
FA 10	Business Employment	Investigate forested area for potential watercourses and SAR habitat.
FA 11	Business Employment/Buffer	Confirmation of watercourse classification.
FA 12	Business Employment	Confirmation of watercourse classification.

4.2.5 Field Maps

Prior to field work, Madrone used the desktop data described above, in addition to a 2015 LiDAR derived Digital Surface Model[45] (DSM) to produce field maps indicating land use designation under the proposed SCH Plan, City of Surrey watercourse classifications, critical habitat as mapped by COSMOS, topography, and tree height. The tree height map was produced by subtracting the DEM from the DSM in ArcGIS (**Figure 6**).

[45] LidarBC – Open LiDAR Data Portal

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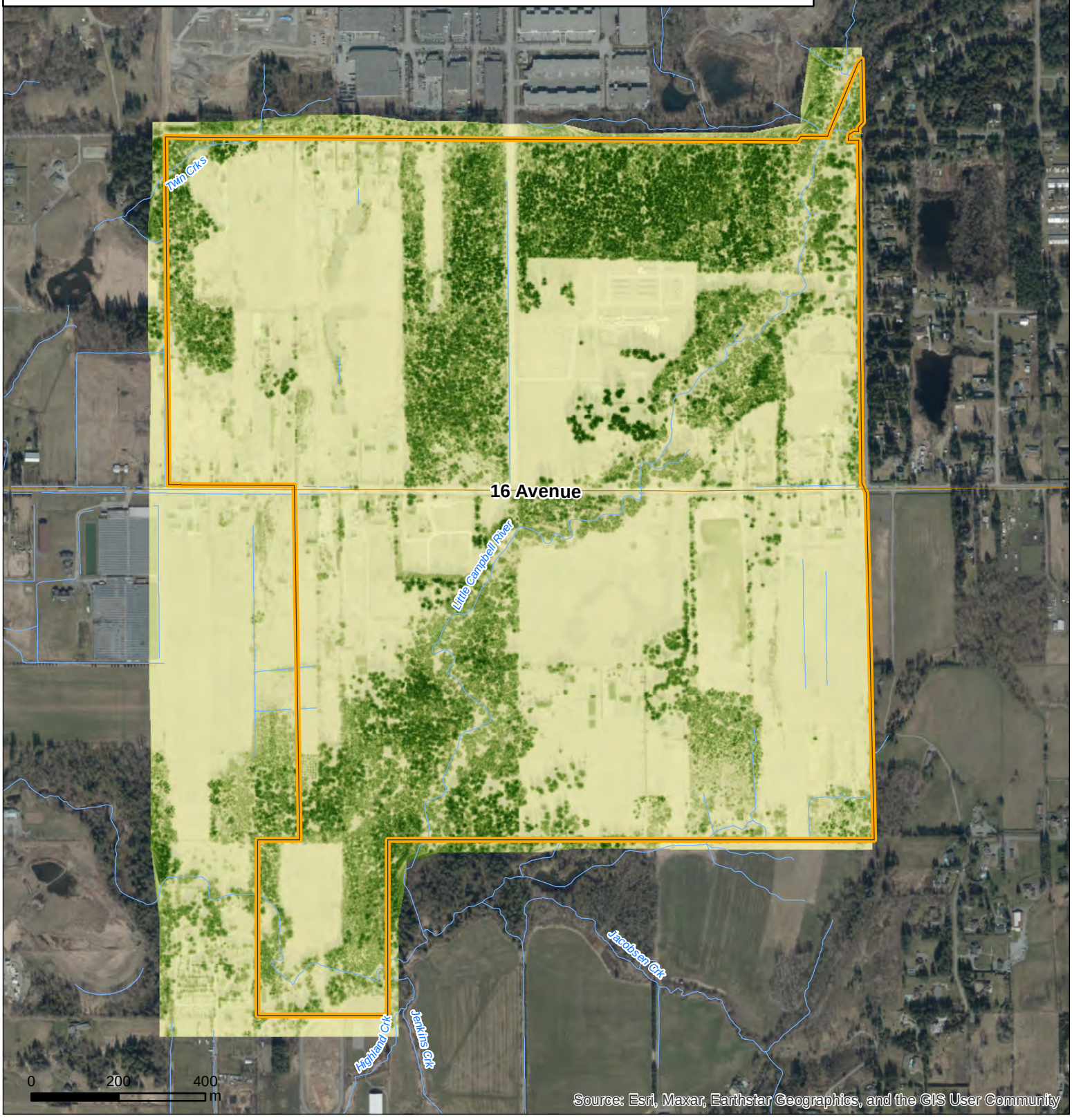
Figure 6: 2015 LiDAR Derived Tree Height in the South Campbell Heights Area



Road

Project Area

Drainage

2015 Tree Height (nDSM)

High : 45

Low : 0

4.3 Field Assessments

Field assessments involved watercourse and habitat investigations as appropriate in each identified focal area. The assessments were performed by Madrone biologists during 4 field visits between March 29th and April 5th, 2022. Watercourse assessments involved classifying watercourses according to RAPR standards, WSA standards, and the City of Surrey's watercourse classification system.

The City of Surrey's watercourse classification system (as well as RAPR designations) apply when watercourses directly connect to fish-bearing streams, while WSA designations apply to watercourses derived from natural water sources but include systems that may not connect to fish-bearing streams via surface flow. Watercourses were assessed for connectivity, RAPR assessments were conducted as necessary, and photo documentation was collected at each study site.

Riparian and terrestrial habitat assessments were completed by pedestrian surveys, Terrestrial Ecosystem Mapping plots, and Detailed Assessments under RAPR. Additionally, field staff documented environmentally valuable resources (EVRs) including vegetation, bird, and wildlife sign. Photo documentation was collected throughout the study area. Madrone obtained access permission from the landowners to perform the assessments on their respective properties. In instances where access was denied by the landowners, Madrone did not make further effort to assess these areas.

5 Results

5.1 Watercourse Classification

Figure 7 shows City of Surrey Stream Classifications prior to field assessments. Field assessments revealed some watercourse classification updates are required under the City of Surrey's Streamside Protection Bylaw (**Table 6**; **Figure 8**). These updates are outlined in **Table 6** and **Figure 8** below and discussed further in Section 6.1. Where wetlands or potential wetlands are noted, the location shown in **Figure 8** is approximate and proper delineation and further assessment are required. Due to the focused scope of work presented herein, and that a census of all water features in the SCH area was not conducted, this list should not be considered an exhaustive list and does not replace the need for a QEP to assess site-specific developments.

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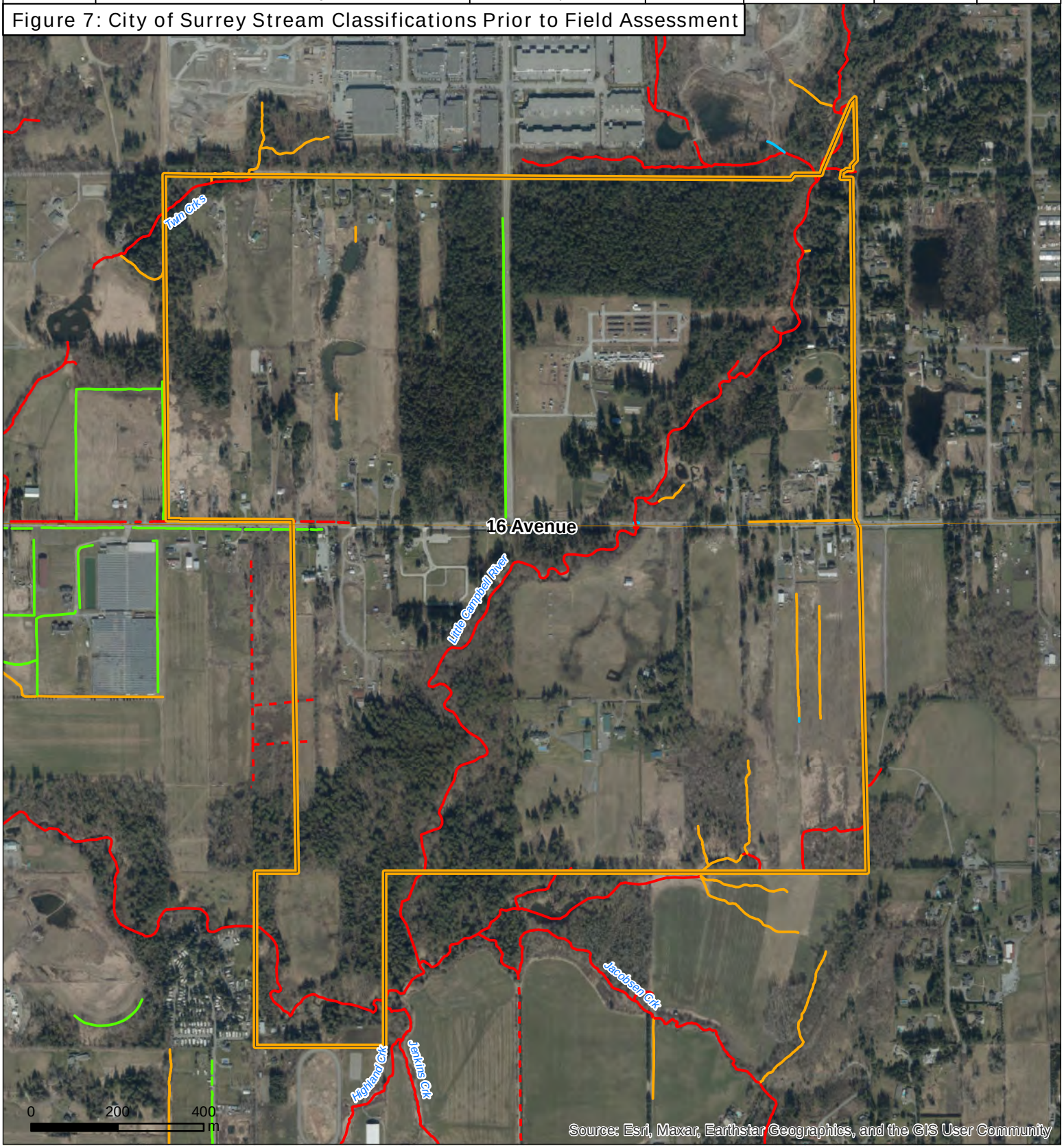
Figure 7: City of Surrey Stream Classifications Prior to Field Assessment



Project Area
Road
Fish Classifications
A
AO
B
C
Unknown

TABLE 6: WATER FEATURE UPDATES IN THE SOUTH CAMPBELL HEIGHTS AREA, SITES ARE LINKED TO FIGURE 8 OF THIS REPORT.

Water Feature ID	Watercourse Investigation Results	Streamside Protection Bylaw Classification Update (Y/N)	Notes (including WSA regulations where not superseded by Streamside Protection Bylaw)
WF 1	Class C streams remain Class C.	N	
WF 2	Class B stream (northern branch of Twin Creeks) reclassified as Class AO (no barrier to fish travel present).	Y	
WF 3	Southern ponds are connected to Class AO stream to south via a culvert. Connectivity between all ponds was not able to be determined without landowner permission; connectivity is likely and presumed.	Y	Ponds regulated by Streamside Protection Zoning Bylaw (supersedes RAPR). If all ponds are not directly connected, the isolated ponds may be regulated only under the WSA.
WF 4	Pond appears to be groundwater fed but not connected to any fish-bearing streams via surface flow.	N	Protected under WSA, but not under the City of Surrey Streamside Protection Bylaw (RAPR).
WF 5	Watercourse is fed by residential sump-pumps necessitated after land south of buildings was infilled to a higher grade than the buildings. WF 5 reaches the fish-bearing watercourse (Class A) to the south via surface flow through a wetland. WF 5 should be extended to the south until the break in slope. Class B is appropriate.	N	Watercourse may not exist without active pumping. This issue could be addressed through an integrated stormwater management plan, or the removal of buildings near the road and the infilling of the depressions they sit in. Original grade of site was higher, but sediment excavation and later partial infilling has left the buildings in a depression that collects water. Watercourse should be reassessed after any hydrology correction. Municipal classification is currently considered correct; however, stream mapping should be updated.
WF 6	Watercourse is fed by residential sump-pumps necessitated after land south of buildings was infilled to a higher grade than the buildings. WF 6 reaches the fish-bearing watercourse (Class A) to the south via surface flow through a wetland but is inaccessible to fish. WF 6 receives increasing groundwater near the break in slope and fans out into a wetland as it nears the Class A watercourse to the south. WF 6 should be extended south to the break in slope. Class B is appropriate.	N	At break of slope WF 6 fans out into a wetland. Northern portion of WF 6 would not exist without active pumping. This issue could be addressed through an integrated stormwater management plan, or the removal of buildings near the road and the infilling of the depressions they sit in. Original grade of site was higher, but sediment excavation and later partial infilling has left the buildings in a depression that collects water. WF 6 should be reassessed after any future hydrology correction. Southern portion of WF 6 likely becomes supported by groundwater. Municipal classification is currently considered correct; however, stream mapping should be updated.
WF 7	Wetland below break of slope receives surface water from upstream watercourses as well as groundwater. Wetland has continuous surface flow to Class A stream to the south but is inaccessible to fish. This wetland should be classified as a Class B stream.	Y	WF 7 is a diffuse wetland that is protected under WSA and should be considered a Class B stream under the Streamside Protection Bylaw. WF 7 should be reassessed after any future upstream hydrology correction.

Water Feature ID	Watercourse Investigation Results	Streamside Protection Bylaw Classification Update (Y/N)	Notes (including WSA regulations where not superseded by Streamside Protection Bylaw)
WF 8	The main channel of Jenkins Creek currently classified as Class B within the SCH boundary should be reclassified as Class AO.	Y	Anecdotal information from landowner states that a fish inventory resulted in no captures, but the barrier to fish passage is a beaver dam which should be considered a soft barrier as it could fail and provide subsequent fish access.
WF 9	Ponds, wetlands, and small stream channels are not connected to fish bearing streams via surface flow.	N	Wetlands and ponds regulated under WSA. Development will require further assessment by a QEP. If the site around WF 9 is to be developed a stormwater management program will be needed to mitigate changes to ground permeability and surface flow. Not accounting for changes in permeability and runoff will likely have strong negative impacts on downstream water quality and recharge of the Brookswood aquifer. Planned stormwater management that creates ponds or surface flows will be regulated under WSA and/or the City of Surrey Streamside Protection Bylaw. See HF 13 and HF 14 (**Table 8**) for discussion on how stormwater management could benefit nearby biodiversity.
WF 10	Saturated wetlands with limited surface connectivity to a Class AO watercourse to the northwest was observed	N	Wetlands are regulated under WSA and will require a QEP to assess.
WF 11	Ditch on northern side of road appears passable to fish in the winter, but not during drier times of year. Change the classification of ditch north of road from Class A to Class AO.	Y	
WF 12	The ditch on the south side of the road connects to a stormwater drain that appears to flow into Twin Creeks, a fish-bearing watercourse. Change of classification of ditch south of road from Class C to Class B.	Y	Culverts are considered to maintain surface flow and connectivity.
WF 13	Roadside ditch does not appear to connect to any fish-bearing watercourses. Watercourse should be reclassified from Class B to Class C.	Y	
WF 14	Field between forest stand and road has saturated soils, standing water, and wetland dependent plants. Should be considered a potential wetland and assessed further for site specific work.	N	Potential wetlands will require further assessment by a QEP.
WF 15	Pond is not connected to fish bearing streams via surface flow.	N	Not protected by Streamside Protection Bylaw, but WSA and SARA regulations apply (see **Table 8**)

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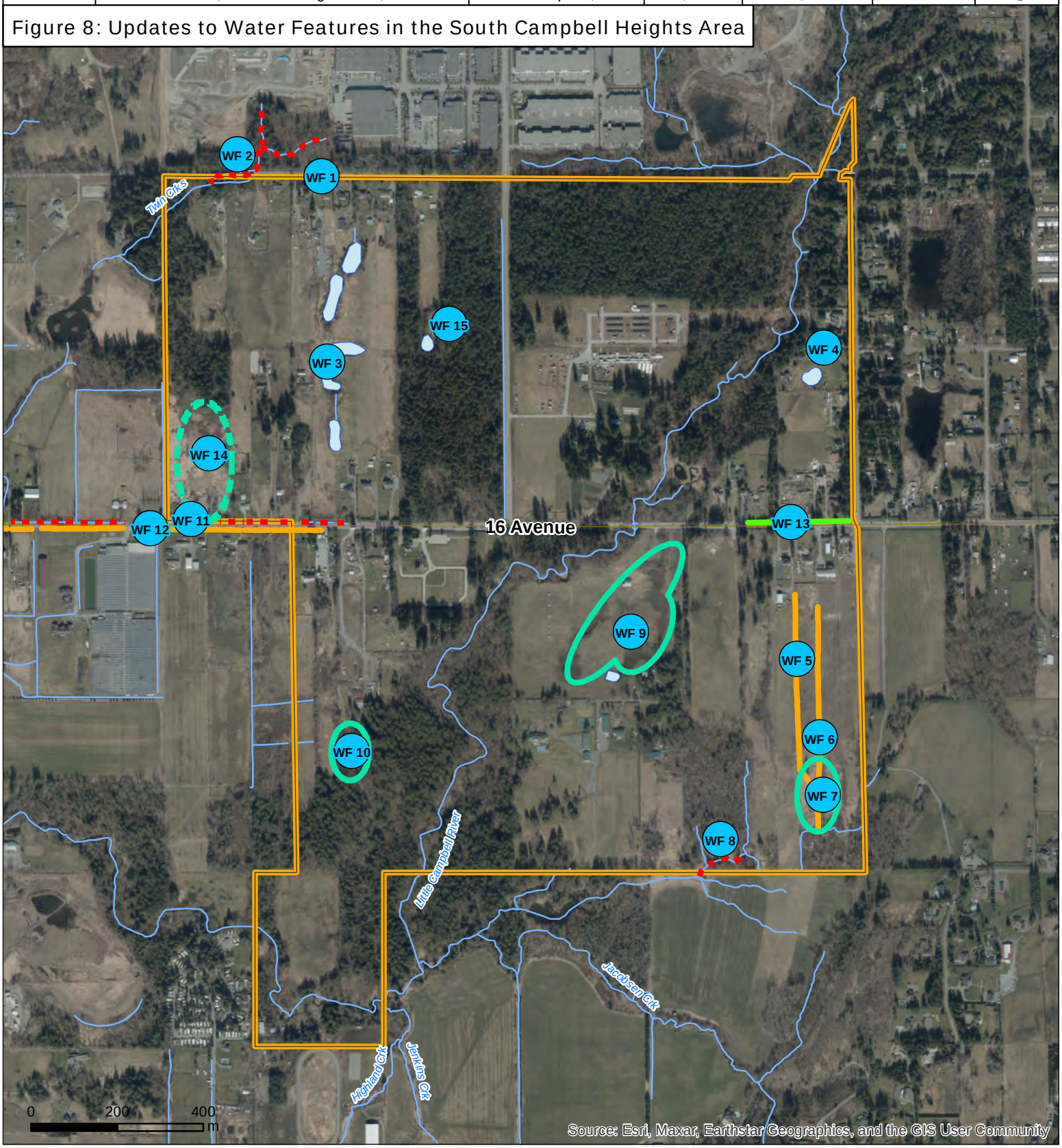
Figure 8: Updates to Water Features in the South Campbell Heights Area



Project Area
Road
Drainage
WF # Water Feature ID
Pond
Wetland (approx. location)
Potential Wetland

Recommended Updates to Stream Classification
AO
B
C

5.2 Species of Interest and Key Habitat Features Assessment

Habitat features for species of interest were assessed for 16 habitat areas. Results of these assessments are outlined in **Table 7** below and supported by **Figure 9**. Further detailed assessment by a QEP of the entirety of each parcel will be required for each SEDP application.

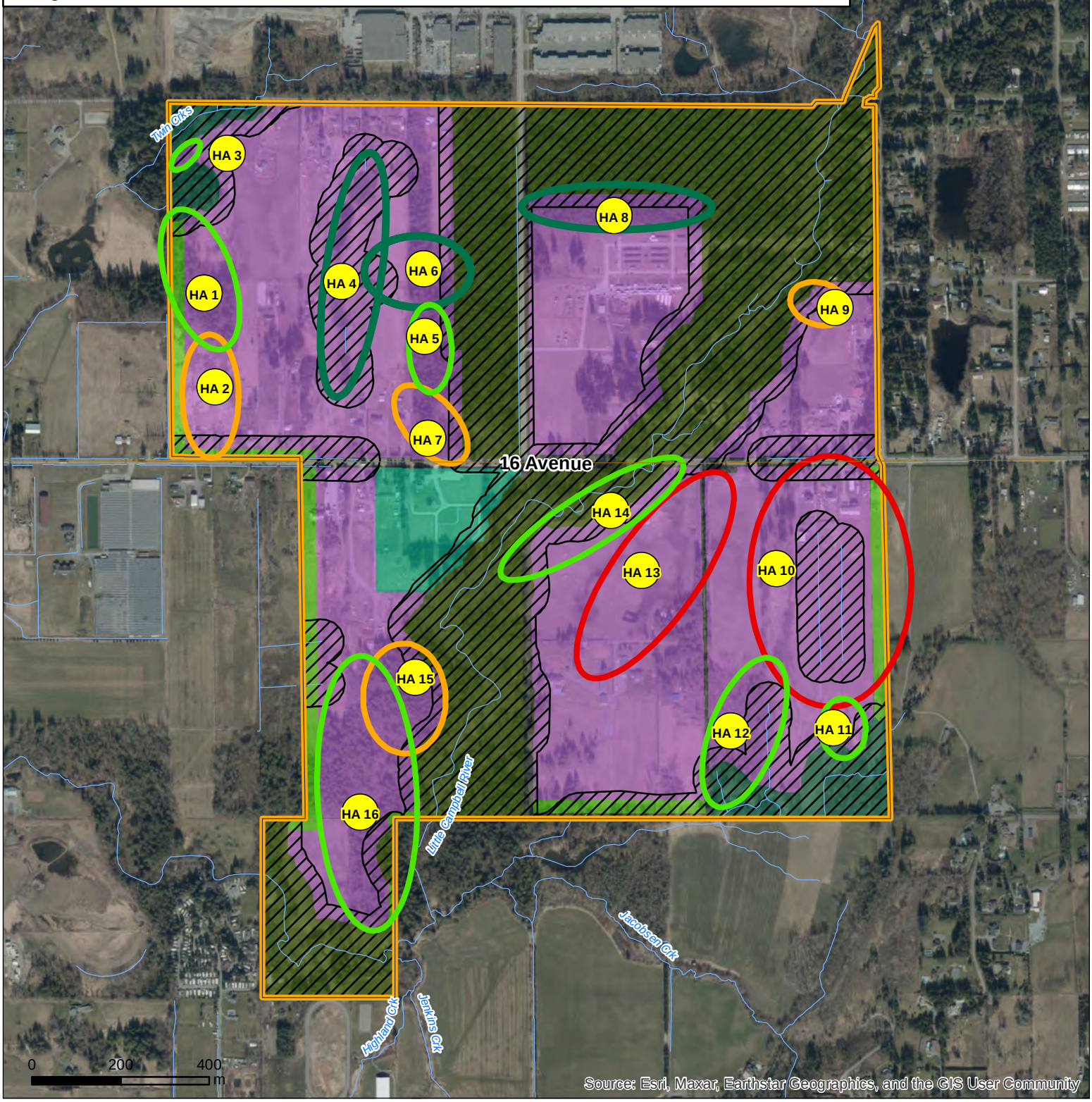
TABLE 7: RESULTS FOR 16 ASSESSED HABITAT AREAS IN THE SOUTH CAMPBELL HEIGHTS.

Habitat Area ID	Habitat Assessment Results
HA 1	The forest stand in HA 1 is difficult to access as it is surrounded by dense stands of Himalayan blackberry. Visual inspection indicates that it contains a diversity of large trees that provide high quality habitat for species of interest, including possible nesting and perching habitat for Barn Owls. A red-tailed hawk and bald eagle were seen flying above, and an active red-tailed hawk stick nest was observed in the contiguous forest stand to the west of the study area.
HA 2	The open grassy areas of HA 2 provide suitable foraging habitat for Barn Owls, and the present buildings could provide nesting habitat.
HA 3	The forested sections around HA 3 host a high diversity of birds and plants, and provide high quality terrestrial, riparian, and wetland habitat features. Frogs were observed in the wetlands but could not be confirmed to species.
HA 4	Ponds hosted abundant migratory waterfowl and adequate vegetation and suitable habitat for Western Painted Turtle.
HA 5	Forest stand contains intact plant communities, abundant deer sign and songbird diversity, maturing forest conditions, and buffers the interior forest conditions of the Biodiversity Preserve to the East. HA 5 contains possible nesting and perching habitat for Barn Owls.
HA 6	The forested portion of HA 6 contains large trees and few invasive species, along with abundant deer sign and songbirds (18 bird species observed during site visit). The pond (WF 15, see **Figure 8**) within HA 6, along with the forested and grassy areas around the pond overlap with mapped Western Painted Turtle critical habitat.
HA 7	This southern portion of the forest stand contains younger trees and more invasive species than the northern portion.
HA 8	Second growth mature trees with an abundance of deer sign and songbirds (22 bird species observed during site visit), a diverse understory plant community, high-quality tree regeneration and midstory structural and vertical complexity. Contains many large trees, as well as standing and downed coarse woody debris. Interior forest conditions provide secure dispersal habitat for many species of interest. Trees on forest edge show signs of adaptation to wind pressure (increased stump growth on leeward side) indicating interior forest trees may be susceptible to windthrow if exposed. Some evidence of cedar die-back which could be related to dry summer conditions.
HA 9	Visual inspection found a well-established pond with active waterfowl use. The pond and surrounding area contain biophysical features consistent with critical habitat for the Western Painted Turtle.
HA 10	Habitat is generally poor for species of interest, though open fields represent possible foraging habitat for Barn Owl.
HA 11	This habitat lies south of fill and soil modifications from an historic quarry. South of the quarry, habitat increases in importance for maintaining downstream water quality. This includes presence skunk cabbage, salmonberry, and larger trees.
HA 12	The area designated as Riparian Conservation in and to the East of HA 12 contains many valuable environmental features including skunk cabbage wetlands and sandy-bottomed streams. Red-tailed hawks were observed nesting in the area. Waterfowl were observed in a beaver pond in the southern portion of HA 12. Rufous hummingbirds were observed feeding on the nectar of the abundant salmonberry shrubs. The forests within HA 12 north of the Riparian Conservation area are relatively young and dominated by deciduous trees. Invasive species such as Himalayan blackberry and reed canary grass proliferate on the edges of the forested areas.
HA 13	HA 13 represents relatively little value for terrestrial wildlife, though development has the potential to negatively impact Brookswood aquifer recharge and water quality of the Little Campbell River (which could affect the Salish Sucker and Western Painted Turtle).

Habitat Area ID	Habitat Assessment Results
HA 14	The riparian forest around the Little Campbell River within HA 14 is of very high quality. Robin nests, a crow nest, and a red-tailed hawk nest were observed, as were the shells of Western Pearlshell Mussels. The southeastern edge of the forested area is heavily populated with Himalayan blackberry.
HA 15	The forested area within HA 15 has varying levels of habitat quality. Many large trees are present, as well as recent observations of raptor breeding by a landowner. The forested understory at the north of this stand is heavily impacted by current business activities and gravel road maintenance. Some areas within HA 15 could provide nesting and perching habitat for Barn Owl, as well as dispersal habitat for Western Painted Turtle.
HA 16	Southern and western portions of the forest stand within HA 16 contain diverse understory plant species and intact soils. Some areas within HA 16 could provide nesting and perching habitat for Barn Owl, as well as dispersal habitat for Western Painted Turtle. Don Welsh, Archeologist for the SFN, found a stone artifact used for creating cutting tools nearby in a gravel bar of the Little Campbell River. Archeological considerations, though not addressed here, should be considered throughout the SCH LAP.

PROJECT: South Campbell Heights Local Area Plan Environmental Consultation		CLIENT: City of Surrey	LOCATION: Surrey, BC	DOSSIER: 22.0046	
ASSESSED BY: Richard Borthwick, R.P. Bio & Greg Howard, R.B. Tech	FIELD VISIT: March 29 - April 5, 2022	MAP SCALE: 1:12,000	MAPPING DATE: June 10, 2022	DRAWN BY: Anna Jeffries	

Figure 9: Assessed Habitat Areas and Relative Priority for Protective Measures. Shown Overlaid on the Land Use Designations of the Current South Campbell Heights Local Area Plan



Project Area
Road
Drainage
HA # Habitat Area ID

Habitat Priority Ranking
Highest
High
Moderate
Low

South Campbell Heights Land Use
Business Employment
Biodiversity Preserve
Riparian Area /
Cemetery

Buffer
Sensitive Ecosystem DPA

6 Recommendations and Guiding Principles

6.1 Watercourse Classification Updates

Table 6 outlines 9 changes to the classification of streams as regulated by the City of Surrey's Streamside Protection Bylaw, including three watercourses requiring further management and assessment. The three watercourses requiring further management and assessment are water features 5, 6, and 7 (see **Table 6** and **Figure 8**). WF 5 and WF 6 represent an unusual hydrological case where previous excavation, building, and later re-grading has created a situation where buildings on several properties to the north of these watercourses are below the current water table during the wet months. Sump pumps used to remedy this situation are the main source of water for the watercourses that eventually enter a wetland (WF 7) and connect to a fish-bearing watercourse. We currently recommend maintaining the Class B status of WF 5 and WF 6, as well as extending these features south to the break in slope where WF 7 begins. We also recommend classifying WF 7 as a new Class B stream. The classification and locations of these watercourses may change if action is taken to alter the hydrology at the northern portion of these lots. This could be accomplished through the ISMP or through future development processes by working with the City of Surrey and the required QEPs.

6.2 Species of Interest and Key Habitat Features – Opportunities for Compensation and Local Area Plan Adjustment

As noted in the 2015 Madrone Environmental Study, "*all of the forested ecosystems mapped in the study area are considered at-risk in B.C.… It cannot be overemphasized how unusual it is to have complex forest structures with high densities of large trees within the lower mainland.*" All the forested areas in SCH are disproportionately important for biodiversity because of their context in a landscape with highly fragmented and reduced forests. Using 2015 LiDAR data, Madrone calculated that forests with intact plant and animal communities and canopy heights of over 35 meters only cover 20 ha of the 245 ha SCH (8%). The Current SCH LAP designates 2.8 ha (14%) for potential development and the remaining 17.2 ha (86%) are included in conservation areas or setbacks. Forests with canopies over 15 m and moderately intact plant and animal communities cover 93 ha of the 245 ha SCH (38%), and the Current LAP designates 24 ha (26%) of these 93 ha for potential development. Retention of these important forest features is integral to maintaining connectivity objectives of the GIN and mitigating adjacent development impacts. It is our recommendation that all areas that meet a 15 m or greater canopy cover be considered highly important for achieving the City of Surrey's Biodiversity Conservation Strategy objectives outlined by the OCP which states the following objective: "*identify, protect, enhance and manage Surrey's biodiversity and network of significant natural ecosystems*".[46] Notably, four of the habitat areas discussed below (5,6,7, and 8) were included in the Green Infrastructure Network (GIN) when the 2015 report was written but have since

[46] City of Surrey Official Community Plan, Theme D: Ecosystems

been removed in the revised plan. Adjusting what is proposed in the revised LAP so that areas originally identified for conservation are retained will preserve important natural features. We recommend reinstating the areas represented by HA 5, 6, and 8 of the GIN as part of the plan's conservation lands (**Tables 7** and **8**, **Figure 9**).

In **Table 8** below we discus 16 habitat areas (also see **Table 7** and **Figure 9**) and provide overview considerations for their management. These assessments and considerations are intended to help guide development planning by providing overview information of habitat features that are likely relevant to the SEDP application process. This includes identification of biophysical features potentially consistent with SAR critical habitat, other sensitive ecosystem features, locations of high compensatory (restoration) value, and areas where development is likely to cause the least environmental disruption. It is important to note that for ease of interpretation not all SAR critical habitat is contained in discussed habitat areas, but that all development within identified critical habitat must comply with SARA by achieving effective protection. A QEP assessment will be required for all SCH area developments to identify sensitive environmental features, meet SEDP application guidelines, and develop plans and procedures to comply with relevant environmental regulations.

To help support planning across SCH we have ranked these habitat areas in order of relative priority: low, moderate, high, and highest. These rankings and the descriptions in **Table 8** are designed to help provide a framework for considering ecosystem values during planning and development.

TABLE 8: ASSESSED HABITAT AREAS AND RELATIVE PRIORITY (LOW, MODERATE, HIGH, HIGHEST) FOR PROTECTIVE MEASURES. SEE TABLE 7 AND FIGURE 9 FOR FURTHER HABITAT DETAILS AND LOCATION.

Habitat Area ID	Considerations for the SEDP permitting process and adjustments to the LAP	Relative Priority
HA 1	This area and the field to the south (HA 2) contain biophysical features identified in the Barn Owl recovery strategy. There are large trees for perching and nesting, open fields for hunting, and abandoned buildings for roosting. HA 1 will require QEP assessment for critical habitat, nesting birds, and raptor nests. Development in this area may require substantial mitigation as there is the potential for the destruction of Barn Owl critical habitat. HA 1 also provides a compensation opportunity through the removal of invasive species. Maintaining the forest stand and improving connectivity to the ponds within HA 4 would improve wildlife movement potential and improve GIN utility. Connectivity to HA 3 to the north is present and should be maintained.	High
HA 2	During the field assessment, this field was inundated with water and may be a potential wetland (WF 14), which requires further detailed assessment by a QEP. Due to water levels at the time of assessment, this area should be considered in the ISMP. Modifying flow may impact water storage and therefore downstream water quality. Further, it can alter habitat for wildlife. If not a wetland, the field represents suitable foraging habitat for Barn Owl, and old buildings onsite provide nesting habitat. Removing the old buildings could be detrimental to Barn Owl and Barn Swallow nesting and roosting.	Moderate
HA 3	Most of the area of the LAP around HA 3 conserves important natural features, however HA 3 itself represents a triangle of tall trees which have been left out of the Conservation Area for upper Twin Creeks. Protecting the entire stand of trees will decrease negative edge effects to interior forest and riparian habitat and retain ecologically valuable features.	High
HA 4	The ponds within HA 4 should be maintained. They also offer an opportunity for restoration. Riparian revegetation could improve habitat for Barn Owl, Western Painted Turtle, Pacific Water Shrew, and other species like the Northern Red-legged Frog and Western Toad. Habitat around the ponds could be enhanced to create high quality nesting habitat for Western Painted Turtle. Habitat connectivity could be established among HA 1, HA 4, and HA 6. Pedestrian and vehicle access may be compatible with habitat features if adequate wildlife crossings and habitat corridors are provided and if SAR critical habitat is appropriately accommodated for.	Highest
HA 5	Retaining HA 5 would protect interior forest conditions of forest stand on the west side of 192 St and maintain connectivity between the ponds to the west (HA 4) benefitting deer, songbirds, and some SAR.	High
HA 6	HA 6 is within Western Painted Turtle critical habitat and contains biophysical features identified in the recovery strategy (e.g., ponded water, open terrestrial habitat types, and natural terrestrial habitat features). HA 6 also buffers the interior forest conditions of the adjacent conservation area and is in a strategic location for habitat connectivity to HA 4.	Highest
HA 7	This portion of the forest stand buffers the high value interior forest to the north, and its removal may degrade interior habitat conditions.	Moderate
HA 8	The forest stand in HA 8 is of extremely high quality, especially when considering the rarity of this ecosystem type in the Lower Mainland. Forest with canopy heights over 35 m and intact plant and animal communities comprise only 8% of the SCH. Developing the forest in HA 8 could degrade the quality of the remaining forest stand through the loss of interior forest features resulting from: increased windthrow vulnerability of remaining trees, increased sun and wind exposure (direct southern exposure), spread of invasive species, decreased soil moisture, potential increased western redcedar dieback impacts, and decreased nesting and roosting habitat for birds and bats. The protection of HA 8 aligns with the City of Surrey's Biodiversity Conservation Strategy and Urban Forest Management Strategy as well as the City's Climate Change Action Strategy.	Highest
HA 9	HA 9 is within identified Wester Painted Turtle CH and contains a WSA regulated pond. The recovery strategy for Western Painted Turtle describes some suburban and urban land uses compatible with critical habitat that may be appropriate for this area.	Moderate
HA 10	Northern portion of watercourses would not exist without active pumping. This issue could be addressed through the ISMP or the removal of buildings near the road and the infilling of the depressions they sit in. A complex site history has left existing structures in a depression that collects water. Watercourses should be reassessed after hydrology correction. Western portion of HA 10 is within identified Barn Owl critical habitat and the recovery strategy should be consulted.	Low

Habitat Area ID	Considerations for the SEDP permitting process and adjustments to the LAP	Relative Priority
HA 11	HA 11 should be classified as a wetland and it is regulated under the Streamside Protection Zoning Bylaw and the WSA. The extent of the wetland was likely modified by excavation during the early part of the last century, but it appears to be fed by natural groundwater and contains wetland indicator species like skunk cabbage. This area is currently providing habitat for many species, as well as water quality and flow attenuation services for downstream Salish Sucker critical habitat. The wetland is likely to persist regardless of water management in HA 10 but should be assessed further.	High
HA 12	HA 12 contains many valuable ecosystem features for both biodiversity and environmental services. The areas in and around HA 12 (especially to the southeast and southwest) represent compensatory value as removing invasive species, enhancing hydrology, and restoring forested areas could improve the local and downstream habitat quality, especially for the Salish Sucker.	High
HA 13	The wetlands in HA 13 are protected under the WSA and contribute to water supply of the Little Campbell River. Any development in and around HA 13 needs to account for water management. Retention ponds and/or native plant rain gardens are options for accommodating stormwater runoff. These would ideally be fully or partially integrated into HA 14 (see below).	Low
HA 14	The margin between riparian forest and the open area within HA 14 represents compensatory value through the removal of invasive species and extension of the riparian forest corridor via restoration planting. HA 14 could be a strategic location for stormwater retention infrastructure.	High
HA 15	HA 15 has variable habitat features and quality. Trees within HA 15 are relatively large and diverse, and buffer nearby high value biodiversity areas. The ground and understory vegetation are impacted by gravel road infrastructure and current business activities.	Moderate
HA 16	HA 16 is a high value area for biodiversity. Retaining this area as forest would maintain habitat quality for SAR and other wildlife species by maintaining dispersal corridors for wildlife. HA 16 has skunk cabbage swamps dispersed throughout that require further assessment and protection as WSA wetlands. The field to the southwest of HA 16 could be considered for compensation through invasive species removal and restoration planting along the forest edge to further extend habitat connectivity..	High

6.3 Further Recommendations

6.3.1 Water infiltration and Cumulative Effects

The SCH area is presently impacted by various levels of historical development such as vegetation clearing for the purposes of agriculture, gravel and other sediment excavation, residential homes, and business properties. As further development is proposed within SCH, the cumulative effects on the ecosystems within this area become compounded. A cumulative effects study with the SFN regarding Traditional Ecological Knowledge is underway and will form part of this recommended additional study. Fragmentation of terrestrial habitats is expected to increase with the future development, resulting in decreased biodiversity and habitat quality and availability within and around the SCH area. Further, reductions in the Brookswood aquifer recharge (as discussed in the 2015 Madrone study) could reduce the supply of water to habitat for aquatic species, including SAR, as well as for industrial, commercial, and residential use. Assessing and managing the impacts of development on water quality and volume in Salish Sucker and Western Painted Turtle critical habitat will be a required component of complying with SARA during the SEDP application process. However, individual assessments may not adequately account for impacts to the Brookswood aquifer outside of site-specific considerations. Additional study regarding the preservation and restoration of the Brookswood aquifer is recommended. In alignment

with the 2015 Environmental Study, we emphasize the importance of cumulative effects analyses that address aquifer recharge, as well as SAR, Ecosystems at Risk, and Semiahmoo First Nation's traditional use.

6.3.2 Expand Sensitive Ecosystem Development Permit Areas to include identified Critical Habitat

The direct mechanism for assessing SAR critical habitat during development permitting processes within the City of Surrey requires a parcel of property overlap with an SEDPA. This is the case for every property within the SCH area, but there may be properties in other parts of Surrey that overlap identified critical habitat but are not affected by the SEDPA. It is recommended that the City of Surrey formalize a critical habitat trigger in their development permit application process to ensure that development does not unintentionally impact or destroy critical habitat.

The SEDPA permitting process includes required guidelines (detailed in the DP3 user guide) that include reviewing potential SAR critical habitat and detailing how development plans will protect SAR habitat. One strategy for ensuring that landowners and land managers in the City of Surrey meet their responsibility to comply with SARA is to expand SEDPAs to include identified SAR critical habitat, and to update the SEDPA for any newly identified occurrences of SAR and critical habitat.

7 Conclusion

Future development in SCH will alter habitat features within the boundary of the project area, potentially affecting SAR, Ecosystems at Risk, and other species of interest. These changes will occur in one of the few intact ecosystems within the Surrey's increasingly urbanized landscape. The impacts of development are likely to be disproportionately significant because of the ecological sensitivity of this area. Further cumulative effects analyses, environmental assessments, and consultation with the Semiahmoo First Nation will contribute value information to planning efforts.

A key conclusion of this study is that an SEDPA application is required prior to development for all properties within the SCH area, and the SEDP provides an opportunity for landowners and land managers to protect or effectively protect identified SAR critical habitat. Protecting SAR critical habitat involves reviewing the recovery strategies of SAR with identified critical habitat in and around properties where development is planned to occur, identifying biophysical features that constitute critical habitat, identifying activities likely to result in the destruction of critical habitat, and planning development in line with the appropriate recovery strategies such that critical habitat is protected or effectively protected (i.e. destruction of any part of critical habitat, temporarily or permanently, is not reasonably expected to occur).

The information in this report is intended to support strategic LAP development to facilitate and support conservation, and restoration and to consider and manage avoidance, minimization, and/or offsetting of the negative environmental effects of land conversion. Key areas to improve wildlife connectivity and riparian function were identified. Madrone's 2015 environmental study and this follow up supplemental study offer recommendations and information for balancing economic growth and biodiversity conservation while complying with relevant environmental regulations. With careful planning, changes in SCH need not have a net negative environmental effect.

Sincerely,

MADRONE ENVIRONMENTAL SERVICES LTD.
Reviewed by:

**This is a digitally signed duplicate of the official manually signed and sealed document*

Richard Borthwick, Senior Biologist, R.P.Bio