



**Notice:** Council meetings are held in person at Town Hall. The public can attend meetings in person or view meetings through the Zoom livestream. Recordings of all meetings are available on the Town’s website. To livestream this meeting starting at 6 pm, use this Zoom link: <https://us06web.zoom.us/j/88956545878>

**1. CALL TO ORDER**

**2. LAND ACKNOWLEDGEMENT**

This meeting takes place in the traditional and ancestral territory of the Mi’kmaq people. We are all Treaty people.

**3. APPROVAL OF AGENDA**

3.1 January 23, 2024 Council Meeting Agenda

**Draft motion: That Council approve the agenda for the January 23, 2024 meeting as presented.**

**4. APPROVAL OF MINUTES**

4.1 January 9, 2024 Council Meeting Minutes

**Draft motion: That Council approve the January 9, 2024 meeting minutes as presented.**

**5. PUBLIC INPUT AND QUESTIONS – 20 MINUTES**

- Each person is limited to 3 minutes
- Each person must state their name
- Questions or comments are directed to the Chair

**6. PRESENTATIONS**

**7. CORRESPONDENCE**

7.1 REMO 2023/24 Budget Variance Update

**Draft motion: That Council approve an additional \$1,030 for the Lunenburg County Regional Emergency Management Organization (REMO) 2023/24 budget in support of the REMO Advisory Committee’s motion to approve an additional \$20,200 for the 2023/24 Lunenburg County REMO budget.**

7.2 Appointment of Lunenburg County Accessibility Advisory Committee Community Members

**Draft motion: That Council support the Lunenburg County Accessibility Nominating Committee’s recommendation and appoint Gregory Novak and Louise Hopper to the Lunenburg County Accessibility Advisory Committee, each for a term of three years.**

7.3 Response to What We Heard Report – Friends of Blockhouse Hill

## **8. PUBLIC HEARINGS, PUBLIC INFORMATION MEETINGS AND APPEALS**

### **9. BUSINESS ARISING AND UNFINISHED BUSINESS**

#### 9.1 Motion Amendment: Economic Impact Study

Draft motion: That Council amend the motion previously adopted at the January 24, 2023, meeting, which stated that Council approve the development of an economic impact study/analysis; and that Council approve including \$50,000 in the 2023/24 Draft Operating Budget for the economic impact study/analysis; and that the study not proceed until at least \$50,000 worth of matching funds are provided by non-Town sources with at least \$10,000 coming from every partner of the study to remove the requirement that \$10,000 must be provided from each partner of the study.

### **10. NEW BUSINESS**

#### 10.1 Blockhouse Hill Visioning Report and Design Options

Draft motion: That Council direct Staff to work with MacKay-Lyons Sweetapple Architects Ltd. on drafting development rules based on Design Option 2: Out of Sight.

Draft motion: That Council declare the land identified in Attachment A surplus and no longer required for Town purposes.

Draft motion: That Council direct Staff to hold a Public Information Meeting regarding selling the surplus land identified in Attachment A for residential development.

## **11. NOTICES OF MOTION, INFORMATION REQUESTS AND COUNCILLOR REPORTS**

## **12. IN CAMERA**

## **13. ADJOURNMENT**

TOWN OF LUNENBURG  
**COUNCIL MEETING MINUTES**

January 9, 2023 | 6 pm

Lunenburg Town Hall – Council Chamber and virtually through Zoom



Present	Mayor Jamie Myra, Deputy Mayor Ed Halverson (via Zoom), Councillors Jenni Birtles, Stephen Ernst, Peter Mosher, Melissa Duggan and Susan Sanford
Also present	Jamie Doyle, CAO Lisa Dagley, Director of Finance Tyson Joyce, Director of Public Works Hilary Grant, Director of Community Development Michael Best, Communications Manager Kathleen Rafuse, Town Accountant Lisa Kendall, Municipal Engineer/Project Manager Kayla Byrne, Municipal Clerk
Call to Order	The meeting was called to order at 6 p.m.
Land acknowledgment	The Mayor recognized Lunenburg’s location on the unceded territory of the Mi’kmaq people.
Approval of Agenda	Moved and seconded that Council approve the agenda for the January 9, 2024 meeting as presented.  <b>Motion carried unanimously</b>
Approval of Minutes	Moved and seconded that Council approve the December 12, 2023 meeting minutes as presented.  <b>Motion carried unanimously</b>
2024/25 Capital Budget Presentation	Staff presented the 2024/25 Town General Capital Budget and the 2024/25 Water Utility Capital Budget.  Councillors asked some clarifying questions.
Public Input and Questions on Proposed Capital Budgets	Gale Fullerton inquired about capital upgrades concerning the Electric Utility and commented on possible new debt.  Robert Young inquired about road reconstruction, storm sewers, and upgrades to Town Hall. It was noted Town Hall upgrades are not being considered at this time, as further assessments may still need to be conducted. Mr. Young also inquired about a new Public Works building and the possibility of using geothermal in facilities.

Cornwallis Street Renaming	Council received three letters concerning the renaming of Cornwallis Street.
Advocacy for province-wide vulnerable persons registry	<p>Per a recommendation from the Regional Emergency Management Advisory Committee, Council made the following motion:</p> <p>Moved and seconded that Council authorize the mayor to write a letter to the Nova Scotia Federation of Municipalities (NSFM) and the Minister responsible for the Office of Emergency Management, advocating for creating a province-wide vulnerable persons registry.</p> <p style="text-align: right;"><b>Motion carried unanimously</b></p>
Communities in Bloom Invitation	Council received an invitation to take part in Communities in Bloom programs.
2024/25 Town General Capital Budget	<p>Moved and seconded that Council approve the 2024/25 Town General Capital Budget as presented, totalling \$2,986,000.</p> <p style="text-align: right;"><b>Motion carried unanimously</b></p>
2024/25 Water Utility Capital Budget	<p>Moved and seconded that Council approve the 2024/25 Water Utility Capital Budget as presented, totalling \$2,099,000.</p> <p style="text-align: right;"><b>Motion carried unanimously</b></p>
Reallocation of Funds	<p>Staff presented a report on a request to reallocate funds from the 2023/24 Town Capital Budget.</p> <p>Moved and seconded that Council approve a reallocation of funds within the 2023/24 Town Capital Budget of \$50,000 from the Suction Line Upgrades item to a new Lift Station Communications Upgrades item for improvements at the Effluent and Starr Street Lift Stations.</p> <p style="text-align: right;"><b>Motion carried unanimously</b></p>
Notices of Motion, Information Requests and Councillor Reports	<p>Councillor Mosher inquired about a motion to reconsider the Deputy Mayor's appointment.</p> <p>The Mayor called a recess from 7:07 p.m. until 7:27 p.m.</p> <p>Staff presented the following motions for Council's consideration:</p> <p>That Council agree to waive the required notice to amend the motion which appointed Councillor Halverson as Deputy Mayor; and</p> <p>That Council amend the motion previously adopted at the Nov. 14, 2023, meeting, which stated that Council appoint Councillor Halverson as Deputy</p>

Mayor until the last meeting of Council before the 2024 municipal election to change the term of the Deputy Mayor appointment to Jan. 9, 2024.

Following some deliberation and inquiries, Council voted on the following motions:

Moved and seconded that Council agree to waive the required notice to amend the motion which appointed Councillor Halverson as Deputy Mayor.

FOR	AGAINST
6 Councillors	1 Councillor (Councillor Halverson)

**Motion carried**

Moved and seconded that Council amend the motion previously adopted at the Nov. 14, 2023, meeting, which stated that Council appoint Councillor Halverson as Deputy Mayor until the last meeting of Council before the 2024 municipal election to change the term of the Deputy Mayor appointment to Jan. 9, 2024.

FOR	AGAINST
6 Councillors	1 Councillor (Councillor Halverson)

**Motion carried**

Moved and seconded that Council agree to waive the required notice of motion to select a new Deputy Mayor.

FOR	AGAINST
6 Councillors	1 Councillor (Councillor Halverson)

**Motion carried**

Following a call for nominations for a new Deputy Mayor, the following motion was moved and seconded:

Moved and seconded that Council nominate Councillor Mosher as the Deputy Mayor. Councillor Mosher declined the nomination, and no vote was held.

Council nominated Councillor Ernst for the role of Deputy Mayor, which Councillor Ernst accepted. Following the acceptance, Council voted on the following motion:

Moved and seconded that Council appoint Councillor Ernst as the Deputy Mayor.

FOR	AGAINST
6 Councillors	1 Councillor (Councillor Halverson)

**Motion carried**

- |                        |   |
|------------------------|---|
| In camera              | Moved and seconded that Council move in camera at 7:45 p.m. to discuss agenda item 13.1 acquisition, sale, lease and security of municipal property per Municipal Government Act. |
| Recess                 | Before discussing any in camera items, the Mayor called a brief recess at 7:45 p.m.   |
| Revert to open session | Council reverted to open session at 8:17 p.m. with no items to report.  |
| Adjournment            | There being no further business, the January 9, 2024 Council meeting adjourned at 8:17 p.m.   |

---

The minutes were read and approved.



## Municipality of the District of Lunenburg

10 Allée Champlain Drive Cookville Nova Scotia Canada B4V 9E4

### Administration

Phone: 902.543.8181 Fax: 902.543.7123 Web Site: [www.modl.ca](http://www.modl.ca)

November 9, 2023

Mayor Jamie Myra & Council  
Town of Lunenburg  
119 Cumberland St PO Box 129  
Lunenburg NS B0J 2C0

Dear Mayor Myra:

**RE: REMO 2023/24 Budget Variance Update**

At the October 31, 2023, Regional Emergency Management Organization (REMO) Advisory Committee meeting, the Committee passed the following motion:

**“that the Regional Emergency Management Advisory Committee approve an additional \$20,200 for the 2023/24 budget and recommend approval to the partner municipal units in accordance with Section 20 of the Inter-Municipal Agreement.”**

Please find attached the breakdown of costs per individual unit based on uniform assessment.

Please forward this budget variance update to your Council for consideration and approval. Once approved, please forward a copy of Council’s motion approving the motion to Angela Henhoeffler, Municipality of the District of Lunenburg ([angela.henhoeffler@modl.ca](mailto:angela.henhoeffler@modl.ca)) for insertion on a future REMO agenda.

Sincerely,

Tom MacEwan  
Chief Administrative Officer

/jgp  
Attach.

cc: Angela Henhoeffler, REMC

## Background on REMO Budget

REMO has for several years returned small operating surpluses to the partner units. Early evaluation of the current year's operating forecast suggests that this will not be the case for the 2023/24 budget year.

There are a few factors combining to result in extra expenditures. First, the need for REMO responses, including the major flash flooding event in July have depleted the REMO contingency account. Second, to improve REMO's response capabilities, training for a large number of municipal staff is planned for this fiscal year, which will be provided in house to keep costs lower and to ensure the content is tailored to Lunenburg REMO, but this approach will still incur costs.

Finally, we are anticipating changes to personnel costs according to MODL's salary administration and personnel policies. The estimated differences are summarized in the table below:

Item	Estimated Addition
REMO Contingency	\$4,000
Municipal Staff Training	\$8,000
Personnel Costs	\$8,200

## Proposed 2023/24 REMO Budget Variance

The total approved budget for REMO in 2023/24 is set at \$171,800. The additional anticipated cost for these three items comes to \$20,200 or 12% of the total budget. The breakdown of costs per individual unit based on uniform assessment is provided below:

Unit	Percentage	Amount
Bridgewater	12%	\$ 2,505
Mahone Bay	3%	\$ 505
Chester	30%	\$ 6,080
MODL	50%	\$ 10,080
Lunenburg	5%	\$ 1,030
Total		\$ 20,200



## Lunenburg County Accessibility Advisory Committee (LCAAC)

January 17, 2024

Municipal Councils of:

Town of Mahone Bay

Town of Bridgewater

Town of Lunenburg

Municipality of the District of Chester

Municipality of the District of Lunenburg

RE: Appointment of Lunenburg County Accessibility Advisory Committee Community Members

Dear Members of Council,

The Lunenburg County Accessibility Advisory Committee (LCAAC) currently has two vacancies for community members.

On January 17, 2024, the Lunenburg County Accessibility Nominating Committee comprised of the Mayors and Wardens of the five Lunenburg County municipalities (or their designates) reviewed the applications received from the public call for volunteers and makes the following recommendation to the five Municipal Councils in Lunenburg County:

To appoint Gregory Novak and Louise Hopper to the Lunenburg County Accessibility Advisory Committee, each for a term of three years.

With regards,

Ellen Johnson, MSc(OT), OT Reg(NS)

Regional Accessibility Coordinator

[ejohnson@chester.ca](mailto:ejohnson@chester.ca)

902-277-0456

Friends of Blockhouse Hill  
c/o 211 Cumberland St.  
Lunenburg, NS

Kayla Byrne, Municipal Clerk  
Jamie Doyle, CAO  
Town of Lunenburg

January 15, 2023

Dear Ms. Byrne and Mr. Doyle,

It is our understanding that MacKay-Lyons Sweetapple Architects Ltd. (MLSA) will be presenting their *What We Heard* report on the three “public engagement” sessions held by them in the fall of 2023.

In anticipation of that presentation, Friends of Blockhouse Hill has prepared a document outlining our concerns regarding the MLSA sessions and subsequent *What We Heard* report, and would like it included in the agenda package for the 23 January 2024 meeting.

First, we conclude that the public engagement process was inappropriate, and given that the Town of Lunenburg cannot confirm that UNESCO has been informed of their plans for the buffer zone, we further conclude that the result of that process is irrelevant.

Second, we address Julian Smith’s contribution to the *What We Heard* report (Section 6) and detail the steps required in seeking development approval in a World Heritage Site or its buffer zone.

Third, we note that the MacKay-Lyons Sweetapple “public engagement” sessions did not address the historic Indigenous use of the land in question, and explain why Indigenous participation is essential.

Please confirm receipt of our report and its inclusion in the 23 January 2024 agenda package.

Sincerely

Paula Rennie, for Friends of Blockhouse Hill

**January 15, 2024**

The Friends of Blockhouse Hill wish to respond to the *What We Heard* report by MacKay-Lyons Sweetapple Architects Ltd.

### **Part 1 – RFP and public engagement**

Following an RFP process, the Town of Lunenburg (ToL) awarded a \$175,000 contract to MacKay-Lyons Sweetapple Architects Ltd. (MLSA) to develop design concepts for high-, medium- and low-density residential housing on undeveloped land at Blockhouse Hill.

This land and other lands forming the historical commons in the Town were granted to the townspeople of Lunenburg in 1753 in perpetuity to serve as common lands (“the commons”). In addition to providing the townspeople with open space for recreational activities, since 1994-95 the commons have served as an integral portion of Old Town Lunenburg’s UNESCO World Heritage Site (WHS) Buffer Zone (BZ).

The concept of turning this important open space into high-, medium- and low-density residential housing when there are other alternatives available to meet the Town’s affordable housing needs has met significant opposition from the residents of Lunenburg and the surrounding community.

The FOBH believes that because of the historical use of this land and the fact that it is the last remaining undeveloped land in the Town that is publicly-owned, it is not ideal for housing development. The FOBH further believes that there are other measures the Town could be taking to encourage growth in other areas of the Town, including taking advantage of infill opportunities in Old Town, regulating AirBnB use of a large number of what were previously residential properties, and encouraging housing development closer to existing services. And last, but not least, we believe, as detailed in Part 2 below, that development on Blockhouse Hill presents a threat to our UNESCO designation.

MLSA conducted three public workshops in September, October and November of 2023. No attendance was taken, so there is no way of knowing if attendees live in Lunenburg or outside the town.

In addition, an online survey was posted on the Town website asking for the same input as requested at the in-person sessions, and again, respondents were not asked where they live. In contrast, FOBH were careful to separate petitions signed by residents from those signed by non-residents, so we have exact numbers of signatures from residents and non-residents. At the last Town Council meeting, Mayor Myra asked Hilary Grant if “we can determine the number of non-residents who answered the survey” – it will be interesting to see if that question can be answered.

The sessions were controversial on a number of fronts:

- The sessions were portrayed by the Town as the public’s opportunity to engage with the Town and provide input, however, we feel that the process was intended to elicit approval for subdivision construction on BH Hill and was used by Town Council as a smokescreen for actual engagement with Lunenburgers on the sale of public land for private use.
- Attendance was low – approximately 130 at each session, a mix of residents and non-residents, and Zoom was not offered, as MLSA / the Town wanted people to attend.
- The sessions were introduced by staff members Hilary Grant and Arthur McDonald. Interestingly, in her January 5, 2024 [allnovascotia.com](https://www.allnovascotia.com) article, reporter Sarah Sobanski refers to the MLSA *What We Heard* report (more on that later) as a “Staff Report”, seeming to suggest that both ToL staff and MLSA were

involved in designing, delivering and reporting on the sessions and thus implying that the ToL-contractor relationship was not arms-length.

- There was significant dissension during the first two sessions, exacerbated by MLSA placing employees and family members at each table to 'assist' participants. Several tables' experience was that those employees were heavy-handed and tried to sway responses.
- The UNESCO issue was addressed at the first session by Julian Smith, a heritage consultant hired by MLSA, but only in terms of UNESCO WHS located in large cities, and his comments were largely irrelevant to Lunenburg's situation.
- Although brought up by the public at the first session, the historical Indigenous use of the land was never addressed or centred during this critical era of Reconciliation.
- In the third and final session, attendees were asked to rank the six options presented, two of which were to leave BH Hill as is, or to develop it as a park. Unfortunately for those participants who wanted no development, if they did not show housing options in their rankings, their surveys were discarded and were not included in the final tally. Paula Rennie of FOBH pointed out the problem with this to the lead architect, and she conceded the point, but would not change the process. The What We Heard report says that of the 109 surveys handed in, 11 were deemed incomplete (those who refused to include housing options). Very possibly, others not in favour of housing development realized their surveys would be discarded and simply left without completing them.

The MLSA delivered their What We Heard report at the December 12, 2023 Council meeting.

(<https://townoflunenburg.ca/current-projects/1515-blockhouse-hill-what-we-heard-report/file.html>)

## Part 2: MLSA What We Heard Report

The MLSA sessions and What We Heard (WWH) report focus almost exclusively on housing, and are therefore largely irrelevant to FOBH because they are predicated on an assumption that a housing subdivision of low-, medium- and high-density residential housing is appropriate for and can be built on Blockhouse Hill. **However, to the public's knowledge, ToL staff have provided no concrete assurances from either Parks Canada or UNESCO that this would not impact the UNESCO designation.**

FOBH's interest in the What We Heard report is centred on Section 6 of the report, Questions of Clarification. Section 6 was prepared by MLSA heritage consultant Julian Smith to address some of the questions and concerns raised by participants at the MLSA sessions about Old Town Lunenburg's WHS designation and the potential impact of development in the WHS Buffer Zone.

### Buffer Zone Development Opinions

According to Mr. Smith's assessment, the WHS BZ has little relevance or importance to the Old Town Lunenburg WHS. He offers guidance on how residential development in the BZ can be achieved. His assessment and guidance are in stark contrast to opinions provided to the Town by two of Canada's top heritage experts with significant UNESCO experience, Herb Stovel and François LeBlanc, in the 2010 *Heritage Sustainability Strategy* report:

*"...despite the protection of view planes carefully considered in the Town's [circa 2009] development proposal for Blockhouse Hill, this undertaking does pose some threat to outstanding universal value (OUV) in that open space is mentioned explicitly as a very important part of the values of the Lunenburg inscription. Given the prominent place of this open space in the description of the inscribed world heritage district's attributes, should it be reduced or marred – even tastefully –, **this will open the Town and Parks Canada up to legitimately founded concerns that OUV is at risk.**"*

## Lunenburg Inscription Records

**UNESCO's World Heritage Committee requires that significant changes to World Heritage Sites and their buffer zones be evaluated by their advisory bodies (ICOMOS – International Council on Monuments and Sites), who are required to refer to the original nomination, evaluation and inscription files.**

In Section 6.0, Mr. Smith relies upon retrospective language provided by Parks Canada to UNESCO in 2006, 2014 and 2015, **which we have already identified to both the UNESCO World Heritage Centre and to Parks Canada as being incorrect and inconsistent with the original UNESCO inscription.**

Furthermore, when the Lunenburg World Heritage Site and its buffer zone was inscribed in 1995, UNESCO had not yet adopted the concept of “integrity” in the definition of World Heritage Sites and their buffer zones, and as a result **we believe any present day ICOMOS evaluation is likely to recognize that the 1995 Lunenburg buffer zone carries much more significance than Section 6.0 of the What We Heard report suggests.**

A rigorous analysis of the UNESCO background files is critical to forming a balanced opinion upon which decisions can be based.

## Lunenburg Buffer Zone

An important aspect of the Lunenburg buffer zone is that it provides a non-urban setting of rural open space and water around an historic urban center. The MLSA Section 6.0 assessment is written from an urban landscape perspective; applying urban landscape buffer zone examples of high rises etc. is of little relevance.

What ICOMOS noted in 1995 was important about the Lunenburg buffer zone was that **“development was impractical”** and that local regulation **“lays down stringent conditions relating to the maintenance of traditional rural land uses.”** The ICOMOS 1995 evaluation also highlighted the authenticity of the setting and layout of the town, which had changed minimally since 1753. **The undeveloped rural setting of Old Town Lunenburg and the buffer zone was clearly an important part of ICOMOS' 1995 approval recommendation to the World Heritage Committee.**

## UNESCO Buffer Zones

The role of buffer zones – to protect, support and manage the Outstanding Universal Value and setting of a World Heritage Site – is receiving greater UNESCO scrutiny. At their 2021 meeting, the UNESCO World Heritage Committee noted that they reaffirmed **“the increasing importance of effective buffer zones to support the protection and management of Outstanding Universal Value and building greater resilience of properties to external threats”** and urged State Parties (in Lunenburg's case, Parks Canada), with the support of the UNESCO World Heritage Centre and the Advisory Bodies (ICOMOS, etc.), to **“place particular emphasis on strategic environmental assessment and impact assessments for potential projects within buffer zones to avoid, negative impacts on OUV from developments and activities in these zones,”** and to **“ensure buffer zones are supported by appropriate protection and management regimes in line with the property's OUV, that build connectivity with the wider setting in cultural, environmental and landscape terms.”**

## Urban Development Pressure in Buffer Zones

The same 2021 World Heritage Committee meeting also noted the following with respect to urban pressures on cultural World Heritage properties:

**“The pressures on historic urban areas arising from inappropriate or inconsistent development controls, rapid, uncontrolled and planned development, including large development projects, additions that are incompatible in their volume, mass tourism, as well as the accumulated impact of incremental changes have continued within numerous World Heritage properties and in their buffer zones and settings, and considers that these present potential and actual major threats to the Outstanding Universal Value (OUV) of properties, including their integrity and authenticity, as well as increasing their vulnerability to disasters, including those resulting from climate change”.**

## Development Approval in a Buffer Zone

Making significant changes to a UNESCO World Heritage Site or its buffer zone runs contrary to the idea of attempting to preserve it. While UNESCO does give consideration to the sustainability of World Heritage communities, the Town of Lunenburg has numerous other areas that could support affordable housing initiatives without impacting the existing buffer zone. **We believe that the Town of Lunenburg and its staff have significantly miscalculated the difficulty involved in attempting to develop within the World Heritage Buffer Zone, if the town’s WHS status is to be retained.**

The existing buffer zone (with the exception of one small parcel added in 2016) existed at the time of inscription in 1995, and was supported by statements made in 1994-95 by the Town and Parks Canada that provided UNESCO with an understanding that the buffer zone land would not be developed.

**Following inscription, any significant change to a WHS or its buffer zone requires the consent of the World Heritage Committee.**

Buffer zones can be modified via an abbreviated process for minor changes, but these are reserved for boundary clarifications, extensions and other minor changes, for which the expected outcome is the enhancement of OUV of the WHS. **It is unlikely that the World Heritage Centre would accept a Minor Boundary Modification request to support the development of the existing Lunenburg buffer zone into housing.**

**Development in the Lunenburg WHS buffer zone requires legislative changes in zoning, land-use, building controls, and conveyance of lands from the Town to third parties. These are significant changes to the original conditions stated to UNESCO and require the consent of the World Heritage Committee. In order to request consent for these changes, the Town is required to:**

- 1. Arrange a strategic environmental assessment and/or heritage impact assessments based on UNESCO World Heritage guidance;**
- 2. Ensure that the community and all stakeholders are engaged in the assessment processes and that the process follows UN Conventions for community engagement;**
- 3. Prepare a proposal supported by the assessment(s);**
- 4. Request that Parks Canada submit the proposal and supporting documentation to the World Heritage Centre for consideration of the World Heritage Committee**

Following receipt of the proposal, the World Heritage Centre would:

- a) Engage UNESCO advisory bodies, likely ICOMOS International, to review and report on the request and related assessments;**
- b) If supportive, ICOMOS would then be asked by the World Heritage Centre to make a recommendation to the World Heritage Committee to support the proposal.**

The above steps would need to be completed in sufficient time for the ICOMOS recommendation to be submitted prior to February 1st of any year, for consideration by the World Heritage Committee later that year. **The most rapid time assessment to complete the above process would be a positive or negative response in late 2025.**

There is no guarantee that ICOMOS would agree to recommend any proposal to develop in the Lunenburg buffer zone, and there is no guarantee that the World Heritage Committee would agree with a positive ICOMOS recommendation.

**If either ICOMOS or the World Heritage Committee do not support the proposal, the only other option open to Lunenburg is to submit a new request to be an inscribed World Heritage Site, with the removal of the buffer zone areas to be used for development.**

**The Lunenburg WHS would be placed on the tentative list for approval, but the timelines and budget costs to achieve this would be significant.**

However, at the last ToL Council meeting, Hilary Grant (now Community Development Director) said that the worst UNESCO could do is put Lunenburg WHS on the endangered list, and stated that “the sky is the limit” in terms of what can be done within her proposed new Transition Area, which includes Blockhouse Hill.

Unfortunately, Lunenburg’s World Heritage Site management history is deficient and numerous policy and zoning changes which negatively impact the controls over the World Heritage buffer zone have been implemented. These factors may also work against any UNESCO proposal from the Town to develop within the buffer zone.

Town Council and staff have erred in putting the horse before the cart. They appear not to have kept Parks Canada informed of the scope of their plans, including the 2021 rezoning of BH Hill from low-density housing on a small swath of land on the lower slope and park and residential zoning across the rest, to the current zoning (low-, medium- and high-density residential). **We do not know if Parks Canada has kept UNESCO apprised of any changes that may have been reported to Parks by the Town, nor, again, do we know exactly what the ToL has reported to Parks over the years. For example, a 3-storey apartment building was constructed above the old library and a modern 3.5 storey residence was built opposite the VIC – both are within the buffer zone, and both impact view planes, but we do not know if their construction was reported to Parks and thereby to UNESCO.**

According to what we were told at the MLSA session 3, “Updates have been shared with Parks Canada, including recordings of sessions.” At session 3, a participant asked if Parks Canada had seen the final design concepts. The answer: Parks Canada is aware of sessions and updates and YouTube links. Question: so, no specific feedback from Parks? Answer: No, they will see them on video.

Paula Rennie, on behalf of FOBH, filed a FOIPOP request to the CAO of the Town of Lunenburg on October 20, 2023, requesting copies of all communication, correspondence and reports of telephone calls between the ToL and Parks Canada. On November 16, she enquired as to the status of the request and was told that the documents would be forthcoming within a few days. She was further told that Parks Canada was reviewing the information **at that time** and that feedback would be forthcoming by December 15. However, a Parks Canada email forwarded to Ms. Rennie by the Town shows that they did not receive the file from the ToL until December 4, and that the information requested will not be forthcoming until February 5, 2024 at the earliest.)

### **Part 3: An Indigenous Centered Perspective, TNR Recommendations, and Reconciliation**

Unfortunately, the three sessions presented by Town staff and MLSA did not address the historic Indigenous use of Blockhouse Hill in any substantive manner.

On March 21, 2023, Peggy Handel, a Bridgewater lawyer, on behalf of her client, an Indigenous resident in the Town of Lunenburg, wrote to the Town of Lunenburg on behalf of her client, Mi'kmaw resident of the Town. (Please see the last page of the FOBH report (Report on a Threatened UNESCO World Heritage Cultural Site – *What We Learned* – Old Town Lunenburg and its Buffer Zone), which was submitted by FOBH to UNESCO and Parks Canada on November 23, 2023, to Kayla Byrne, Clerk on November 28, 2023 and to Jamie Doyle, CAO on December 1, 2023. The letter, which the Town seems to have ignored, refers to the traditional use of the land by the Mi'kmaw, the potential for lost Mi'kmaw history of the land, and the 1760 Peace and Friendship Treaty referred to in the R. v. Marshall, [1999] 3 S.C.R. 456 signed by Governor Lawrence and Chief Paul Laurent (on behalf of the "Lahave Indians") that led to better relations between the British colonizers and the Mi'kmaw who were, at the time, aligned with the Acadian settlements along the South Shore of Nova Scotia. In particular, and of deep relevance to the matter at hand, the exchange of good-will between each party resulted in a number of references to peace expressly to Lunenburg.

The Supreme Court of Canada acknowledged that this treaty led to the ultimate founding of Canada and set forth the rights of each party including the current right to a moderate livelihood in the case of Donald Marshall, Jr. This treaty, between Lunenburg area Mi'kmaw, very importantly, gave rights to that moderate livelihood throughout Atlantic Canada.

At the time of UNESCO inscription there were no Indigenous identifying residents living in the Town. At the present time, there are more than a half dozen families who identify as Mi'kmaw and one of Lunenburg's largest employers is now more than 50% owned by a First Nations alliance (Clearwater Seafoods Ltd.).

Donald Marshall Jr.'s legacy in Nova Scotia is profound and remarkably that history remains silent in the British Settlement of Lunenburg. Currently, the Town is considering commemorative plaques at another part of Town to address the occupation of the lands by the Indigenous community.

Call to Action #79 from the Truth and Reconciliation Commission says:

*We call upon the federal government, in collaboration with Survivors, Aboriginal organizations, and the arts community, to develop a reconciliation framework for Canadian heritage and commemoration. This would include, but not be limited to:*

*i. Amending the Historic Sites and Monuments Act to include First Nations, Inuit, and Métis representation on the Historic Sites and Monuments Board of Canada and its Secretariat.*

***ii. Revising the policies, criteria, and practices of the National Program of Historical Commemoration to integrate Indigenous history, heritage values, and memory practices into Canada's national heritage and history.***

*iii. Developing and implementing a national heritage plan and strategy for commemorating residential school sites, the history and legacy of residential schools, and the contributions of Aboriginal peoples to Canada's history.*

Because of the UNESCO designation, thousands of visitors come to Lunenburg to interact with the colonial settlement history of the Town. There is no better place in Canada for exposing and integrating "Indigenous history, heritage values, and memory practices into Canada's national heritage and history" than Lunenburg's Blockhouse Hill with its rich history of battles, tensions, and eventual signing of the Peace and Friendship Treaty between the colonial settlers and the "Lahave Indians".

To date, the area has only settler historical perspective.

This was brought up by more than one participant at the "sessions" but the Indigenous perspective remains uncentered. The FoBH remains committed to inviting Mi'kmaw leaders and scholars to participate in this incredibly important aspect of Truth and Reconciliation. The "Truth" of Indigenous presence and use of these lands must be

considered before any further discussion is made and particularly in order to facilitate "Reconciliation".

We have made this issue clear to UNESCO and will continue to do so.

Respectfully submitted,  
Paula Rennie, for Friends of Blockhouse Hill

**Subject:** Motion Amendment: Economic Impact Study  
**From:** Hilary Grant, Director of Community Development  
**Reviewed by:** Jamie Doyle, CAO  
**Date:** January 23, 2024

---



## **Recommendations**

That Council amend the motion previously adopted at the January 24, 2023, meeting, which stated that Council approve the development of an economic impact study/analysis; and that Council approve including \$50,000 in the 2023/24 Draft Operating Budget for the economic impact study/analysis; and that the study not proceed until at least \$50,000 worth of matching funds are provided by non-Town sources with at least \$10,000 coming from every partner of the study to remove the requirement that \$10,000 must be provided from each partner of the study.

The amended motion reads as follows:

That Council approve the development of an economic impact study/analysis; and that Council approve including \$50,000 in the 2023/24 Draft Operating Budget for the economic impact study/analysis; and that the study not proceed until at least \$50,000 worth of matching funds are provided by non-Town sources.

## **Alternatives**

- Amend the motion differently.
- Delay a decision.

## **Background**

On January 24, 2023, Council moved and seconded that Council approve the development of an economic impact study/analysis; and that Council approve including \$50,000 in the 2023/24 Draft Operating Budget for the economic impact study/analysis; and that the study not proceed until at least \$50,000 worth of matching funds are provided by non-town sources with at least \$10,000 coming from every partner of the study.

A revised motion removing the stipulation that at least \$10,000 must come from every partner would streamline staff efforts to secure funding for an economic impact study.

## **Discussion**

The absence of reliable data sets on visitation numbers and GDP for Lunenburg has been a longstanding challenge. The proposed Economic Impact Study addresses this gap by measuring economic impact through employment, wages, visitation numbers, GDP, and

other economic output indicators. The study will encompass asset mapping, detailed surveys, interviews, and employment analysis. The study can potentially attract investment and leverage funding opportunities for the Town.

The Lunenburg Board of Trade and the Lunenburg Cultural Collective have expressed interest in a cultural tourism economic impact study. On September 14, 2021, Council endorsed collaboration with the Lunenburg Cultural Collective's Cultural Roundtable.

Unfortunately, the motion passed on January 24, 2023, complicates the process of seeking and securing grants for an economic impact study. This is because it discourages community engagement and imposes a rigid funding structure on potential donors.

### **Strategic Plan Relevance**

- Create and maintain a detailed inventory of community economic data including, but not limited to, labour market statistics, a business directory, vacant land and storefront inventory, and a 'development ready' land inventory.

### **Relevant Legislation**

The Municipal Government Act (MGA)

### **Financial**

Council already approved \$50,000 for an Economic Impact Study. The proposed amendment does not increase the budget. Staff anticipate an amended motion will make securing funding for the project easier.

### **Communications**

N/A



**Subject:** Blockhouse Hill Visioning Report and Design Options  
**From:** Hilary Grant, Director of Community Development  
**Reviewed by:** Arthur MacDonald, Planning and Heritage Manager  
Tyson Joyce, Town Engineer  
Jamie Doyle, CAO  
**Date:** January 23, 2023

---

### **Recommendations**

That Council direct Staff to work with MacKay-Lyons Sweetapple Architects Ltd. on drafting development rules based on Design Option 2: Out of Sight.

That Council declare the land identified in Attachment A surplus and no longer required for Town purposes.

That Council direct Staff to hold a Public Information Meeting regarding selling the surplus land identified in Attachment A for residential development.

### **Alternatives**

- Direct Staff to work with MacKay-Lyons Sweetapple to draft development rules for one of the other design options.
- Declare the land identified in Map B or C surplus and no longer required for Town purposes.
- Delay a decision.

### **Background**

MacKay-Lyons Sweetapple has prepared four Blockhouse Hill design options for Council's consideration (Attachments D and E). Each option, illustrated as a complete build, can be phased over several years to align with the Town's growth demand. Preliminary design options were presented at Workshop Three on November 16, with subsequent refinements based on public feedback. The attached Visioning Report (Attachment F) details the design approach and options and includes heritage, archaeological, engineering, and costing analyses.

Drafting development rules is part of MacKay-Lyons Sweetapple's contract. These rules could form a development agreement or restrictive covenant matching Council's chosen design option. Staff will bring these rules before Council at a later date.

Staff recommend subdividing green and recreational spaces, like Sylvia Park and the campground, off from the back slope of Blockhouse Hill, allowing Council to retain ownership of green spaces while facilitating the sale and development of other lands if desired (Maps A,

B, and C attached). The proposed motion would not declare Sylvia Park of the Campground as surplus land.

Section 8.3.1 of the Town's 'Land Divestiture Policy' mandates a Public Information Meeting before divesting any surplus Residential Use Zone lands. Attachment F shows a land profile against the evaluation criteria in Appendix A of the 'Land Divestiture Policy.' A Public Information Meeting is not required to declare land surplus.

## **Discussion**

The following are some areas of possible consideration in selecting a design option for Blockhouse Hill.

### Housing Need

The South Shore Open Doors Society reported in December 2023 that 16 homeless households on the South Shore originated in Lunenburg, making Lunenburg a significant source of homelessness per population. Lunenburg faces a housing crisis, evidenced by the stark gap between housing demand and the available supply. As of the end of 2022, this shortfall amounted to approximately 65 units. Projections made in the [Province's Municipal Housing Needs Report for the Town of Lunenburg](#) indicate that by 2027 and 2032, the Town will require 120 and 170 new units to accommodate the growing population. Affordability is a concern. 85% of couples, 93% of lone-parent households, and 99% of single-person households fall below the estimated income required to afford local dwellings' 2022 median sale price. At least 9% of renting couples, 40% of renting single parents, and 73% of renting single persons earn below the estimated income required for the 2021 average local rent. When a household lives in a dwelling that requires more than 30% of its before-tax household income and no alternatives exist, it is in core housing need. In 2021, about 4% of Lunenburg's households were in core housing need.

The Community Social Planning Council and Canada Mortgage and Housing Corporations argue that strategically using municipally owned land as a platform for affordable housing is particularly important in areas with high land and housing prices in *Local Government Levers for Housing Affordability* (2023). The distribution of studio and 1-bedroom, 2-bedroom, and 3+ bedroom units in each design option match the projected needs identified in the Town of Lunenburg Municipal Housing Needs Report. The Housing Needs Report found Lunenburg needs 35 studio or 1-bedroom units, 50 2-bedroom units, and 35 3+-bedroom units by 2027. More of each will be required by 2032.

### Green Space

The back of Blockhouse Hill is currently unmanicured green space. Option 4 is the only option that leaves all this green space intact. Option 1, which has the most density, includes retaining 36% of the site as public green space. Option 2 and 3 have 53% and 75% of the site allocated as public green space, respectively.

### Land Use Planning

Development on Blockhouse Hill does not require any policy, by-law or legislative changes. All four design options meet the Town's use, lot and form zone requirements. Across all the development options, single-detached homes with optional accessory dwelling units are limited to the Residential Low-Density Zone along Creighton Street. Townhouses, allowing for the highest density, are incorporated into the Residential High-Density Zone at the bottom of the hill. Each option ensures compliance with a maximum lot coverage of 40%. Lot sizes will vary between 513 m<sup>2</sup> and 2060 m<sup>2</sup>, and frontages vary between 23.5m and 111.5 m. These sizes are all permitted. A comprehensive site plan with individual lot dimensions would be provided alongside any development rules.

Options 1 and 2 include green corridors running down the Hill from Sylvia Park to the Back Harbour Trail perpendicular to the proposed streets. These green streets offer several advantages to these schemes. Firstly, they introduce a rhythm to the block pattern, breaking up the long stretch of road, akin to how a vehicular intersection would mark the end of a block. Secondly, the green corridors serve a practical purpose for site drainage, incorporating natural greenery and soft landscaping to assist with site runoff. Lastly, they establish a network of connecting pathways for walking trails throughout the development. Making these pathways universally accessible would be difficult, given the grade and topography of the site.

### Circulation

Roads perpendicular to the hill would be too steep for vehicular traffic, necessitating the primary network of streets to align with the land's contours, running streets horizontally across the hill. Options 1 and 2 feature road connections from Creighton Street and the Hopson Street Loop to Sawpit Road. Option 3 includes a road connecting the Hopson Street Loop to Sawpit Road. Options 1 and 2 each include two cul-de-sacs.

### Water and Sewer

Development Options 1, 2 and 3 would place additional demand on the Town's existing water and sewer system (including both Treatment Plants) due to the projected increase in population any development creates. Furthermore, industries use large amounts of water and produce large quantities of waste. Thus, it's essential to consider the spin-off impact of residential development on our water and sewer systems if an increase in population is matched by a rise in industrial activity elsewhere in Town. Accompanying industrial growth represents a worst-case scenario of high volumes of water consumption and wastewater accumulation for our systems. Although associated industrial growth seems somewhat unlikely due to the current use of the Town's industrially zoned lands, it is impossible to be sure what will happen.

The Water Treatment Plant (WTP) recently received a significant upgrade through the Filtration Membrane Replacement Project, increasing its water generation capacity. The Water Treatment Plant can now serve a population ranging between 2,975 and 3,899 people, depending on the Town's industrial growth rate. The Water Treatment Plant can

accommodate the population increase projected by the MacKay-Lyons Sweetapple team for Options 2 and 3 should there be no additional industrial growth. The population growth projected under Option 1, or any industrial expansion proportionate to population growth, may necessitate upgrades to the Water Treatment Plant. Still, these projections would be impacted by construction timelines and the demands on systems during construction and occupancy, including any development or growth in other areas serviced by the Water Utility.

The Town's water distribution system will likely require significant upgrades to surrounding areas to facilitate Development Options 1, 2 or 3. If Council directs Staff to continue working the McKay-Lyons Sweetapple on Options 1, 2, or 3, the Town's existing system should be reviewed against the selected option to ensure operating pressures and fire flows would still reach the required levels. Projects such as upgrading the existing transmission main and upsizing mains surrounding Blockhouse Hill (all currently 150mm diameter) may all be necessary (see Costing below for more information).

Upgrades to the existing Wastewater Treatment Plant are in the design phase. Population projections for Design Options 1, 2 and 3 predict greater population totals (4,148, 3,758 and 3,745 people, respectively) than were included in Lunenburg's Comprehensive Community Plan and the Wastewater Treatment Plant Upgrades Pre-Design analysis. It has been recommended that the Town review whether the new Wastewater Treatment Plant's design should have an increased capacity if Council directs Staff to continue working with MacKay-Lyons Sweetapple on Design Options 1, 2 or 3. An additional consideration identified in the Visioning Report is that the Blockhouse Hill development may limit potential growth in other areas due to the Wastewater Treatment Plant's remaining available capacity.

The Town's wastewater collection system would require improvements if Options 1, 2 or 3 were to be built. During storm events, the current flow to the existing lift station at Oxner Drive does not allow for additional capacity without storm separation. Recommendations for storm separation Projects are included in the Visioning Report (and additional Projects have been recommended through the Town's Wastewater System Modelling Project to reduce the flow directed to the Oxner Drive Lift Station that are not included in this Report). There are also upgrades to the lift station pumps at Oxner Drive that could be considered, but further analysis would be required to identify all the impacts on the downstream system. Options 1, 2 and 3 include a fully separated storm system to collect surface water and discharge it mainly towards the Back Harbour (Options 2 and 3 show a minor portion directed towards ditching along Sawpit Road). While no offsite stormwater infrastructure improvements are expected to be necessary with Options 1, 2, or 3, approvals associated with outfalls will be needed from government regulators.

Option 4 presents no measurable change and was not included in any water or wastewater system analysis.

### Archaeology and Heritage

Currently, the archaeology report is not publicly available on the recommendation of the archaeologists who prepared it. Withholding archaeology reports is standard practice under the *Special Places Act* because it protects archaeological resources from potential looting or disturbance.

The archaeology study indicates limited documentation about the agricultural use of the site, with no archaeological evidence apart from apple trees of this use. However, oral histories suggest Blockhouse Hill was known as Apple Tree Hill in the 20th century. While agricultural uses declined, recreational and public uses increased in the 19th century, with some modern features like the remains of the former Lunenburg County Jail (constructed in 1893, abandoned after a fire in 1931) deemed of archaeological significance. Davis MacIntyre & Associates, archaeological consultants, confirmed the likelihood of L'nuk artefacts on the site is low in their report. Archaeological mitigation is recommended for Design Option 1.

Blockhouse Hill is within the UNESCO World Heritage Site Buffer Zone of Old Town Lunenburg World Heritage Site. UNESCO's World Heritage Committee designates buffer zones to safeguard World Heritage Sites from detrimental development. Development is allowed in World Heritage Buffer Zones, and the lower slopes of Blockhouse Hill were zoned for residential development when the World Heritage Committee listed Old Town Lunenburg in 1995 and when the World Heritage Committee created the Old Town Lunenburg World Heritage Site Buffer Zone in 2017. Both Parks Canada and the World Heritage Centre are aware of this project. The Town meets its reporting requirements by keeping Parks Canada informed and providing additional information as requested. Parks Canada decides whether the project should be referred to the World Heritage Committee for review.

Julian Smith's analysis focuses on possible World Heritage Committee concerns, primarily possible visual and functional impacts of possible development. To mitigate visual impact, it is crucial that new developments not obstruct views within Old Town Lunenburg or from the Front Harbour. Julian recommends avoiding construction that rises above Sylvia Park when viewed from the harbour or Old Town's primary street corridors. Regarding functional impact, new developments should contribute to maintaining a healthy community, addressing the effects of tourism on affordable housing and community services.

None of the Design options would be visible from Old Town Lunenburg or the front harbour. Options 2 and 3 include residential development invisible from Sylvia Park as well. Options 1 and 2 approximate Old Town's original block and lot sizes. Green buffers and distinct curving roads and pathways create visual links to Old Town's grid while remaining distinguishable from it.

### Costing

Based on the financial analysis undertaken by Hanscomb Quantity Surveyors, the following unit rate estimates have been determined, including labour, materials, equipment, and subcontractor overheads. The estimates also include a profit for the developer. Union

contractors are assumed for the work, with a 20% allowance covering design and pricing uncertainties and an additional 10% contingency for construction unknowns.

Option 1 would cost \$182,296,400 to build 368 units.

Option 2 would cost \$128,371,300 for 256 units.

Lastly, Option 3 has a price tag of \$89,962,800 for 170 units.

Option 4 does not include development.

The totals for Options 1, 2 and 3 include investments of \$3,402,900, \$2,573,400 and \$1,337,200 in water, sanitary and storm sewer systems, and investments of \$10,533,000, \$5,333,000 and \$5,175,000 in our water and wastewater treatment plants respectively.

In a separate Report for the Water System Modelling Project, the preliminary cost estimates for upgrading the existing transmission main and upsizing mains surrounding Blockhouse Hill are approximately \$15,000,000 for the transmission main and \$4,000,000 for the mains around Blockhouse Hill (Blockhouse Hill service extension, Kempt Road & Blockhouse Hill Road). This work could potentially be staged.

It has been recommended that the Town review whether the new Wastewater Treatment Plant's design should have an increased capacity if Council directs Staff to continue working with MacKay-Lyons Sweetapple on Design Options 1, 2 or 3. This change may increase the scope and cost of the Wastewater Treatment Plant Upgrades Project.

Option 4 has no development costs and does not necessitate an immediate investment from the Town. However, the Town would not realize the short- and long-term financial gains of selling the land and increasing its tax base. A landscaped park is prohibitive. It would mean a multi-million-dollar investment with no cash return.

### Public Response

Council has received written correspondence and heard many public presentations regarding this project, most notably at its meetings on [May 9, June 12, July 11 and November 30, 2023](#). The [What We Heard Report](#), submitted on December 4, 2023, and accepted by Council on December 12, 2023, outlines the outcomes of three public workshops and corresponding online surveys held to gather community input. These workshops touched on heritage, housing density, affordability and open public space. Approximately 150, 120 and 120 people attended workshops 1, 2 and 3 respectively. The What We Heard Report includes both qualitative and quantitative analysis of community responses. For example, responses from workshop 1, which MacKay-Lyons Sweetapple designed better to understand the community's vision for the site, are coded into thematic categories and presented in tables. The results of the ranking survey in workshop three were analyzed quantitatively, with MacKay-Lyons Sweetapple analyzing the results in multiple ways, including and excluding incomplete answer sheets. MacKay-Lyons Sweetapple refined their initial designs based on public feedback. For example, participants interested in development on the site preferred to

see higher density in the blocks. Input from the block exercise helped inform which building typologies were included in the final four development options.

### **Strategic Plan Relevance**

- Housing: Direction to support different types of housing development, tenant structures, and affordability.
- Heritage: Preserve the valuable heritage resources of Lunenburg while embracing an ongoing landscape evolution.
- Community Structure: Direction regarding how the Town will be structured and how land will be used.
- Urban Design: Direction to enhance residents' and visitors' experience of the built environment.

### **Relevant Legislation**

The Municipal Government Act (MGA)

The Comprehensive Community Plan (CCP)

The Municipal Planning Strategy (MPS)

The Land Use By-law (LUB)

### **Financial**

This Visioning Report and development rules are part of the \$144,843.00 (plus HST) budget approved by Council for the Blockhouse Hill Design project.

### **Communications**

Staff will advertise the Public Information Meeting on the Town's website and social media at least five days before the meeting as stipulated in the 'Land Divestiture Policy.' Staff will keep Parks Canada updated on Council decisions.

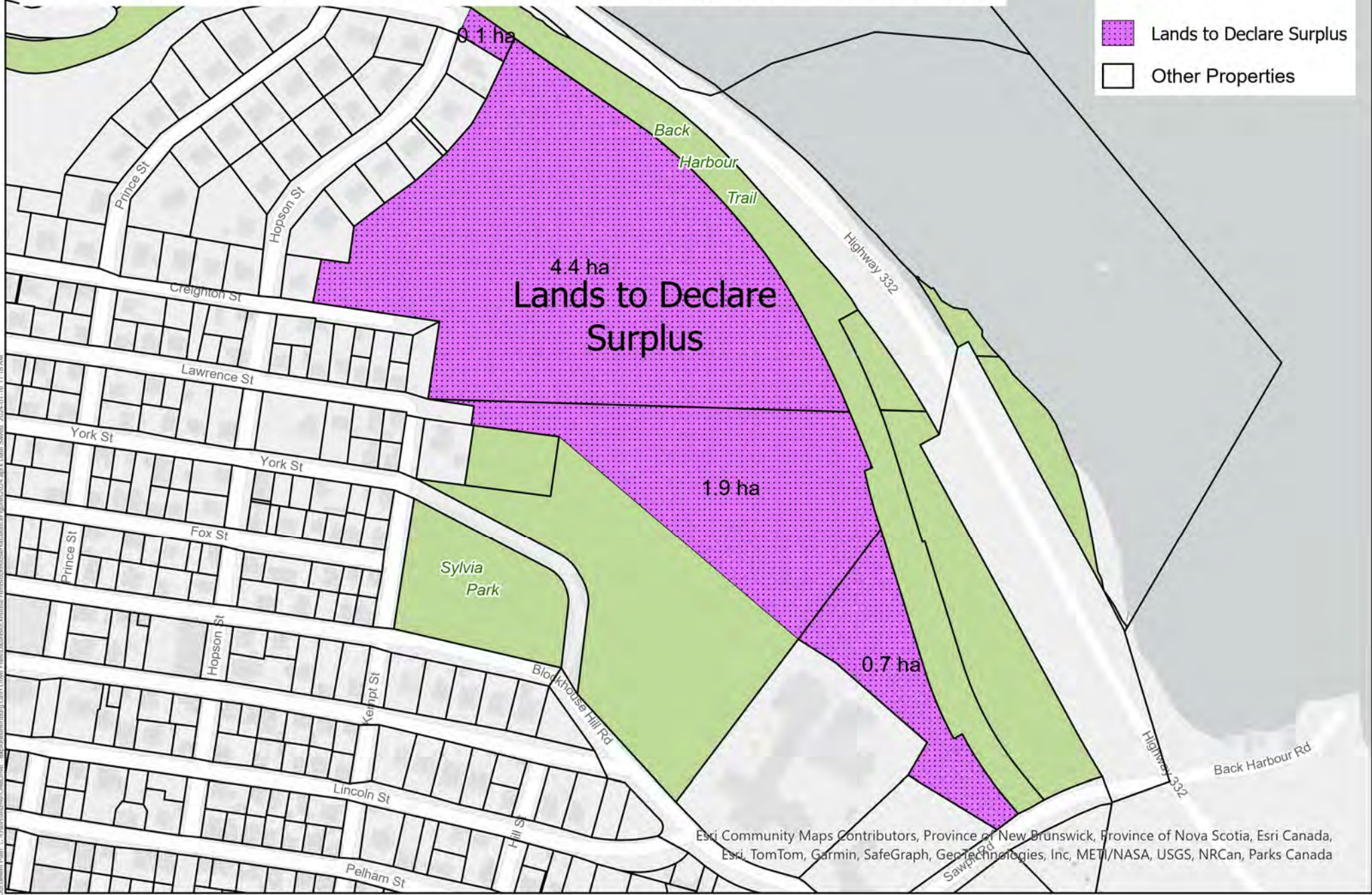
### **Attachments**

- A. Lands to declare surplus following Option 2: Out of Sight
- B. Lands to declare surplus following Option 1: Town Square
- C. Lands to declare surplus following Option 3: Commons Crescent
- D. Design Options Visuals
- E. Design Options Comparison Chart
- F. Blockhouse Hill Design Project Visioning Report
- G. Land Profile Evaluation Tool

# ATTACHMENT "A"- Lands to Declare Surplus Following Option 2: Out of Sight

**Legend**

-  Lands to Declare Surplus
-  Other Properties

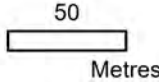


Esri Community Maps Contributors, Province of New Brunswick, Province of Nova Scotia, Esri Canada, Esri TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, NRCan, Parks Canada



Maps are for graphical purposes only. They do not represent a legal survey. While every effort has been made to ensure that these data are accurate and reliable within the limits of the current state of the art, the Town of Lunenburg cannot assume liability for any damages caused by any errors or omissions in the data. Users of our maps and other analysis products are solely responsible for interpretations made from these products.

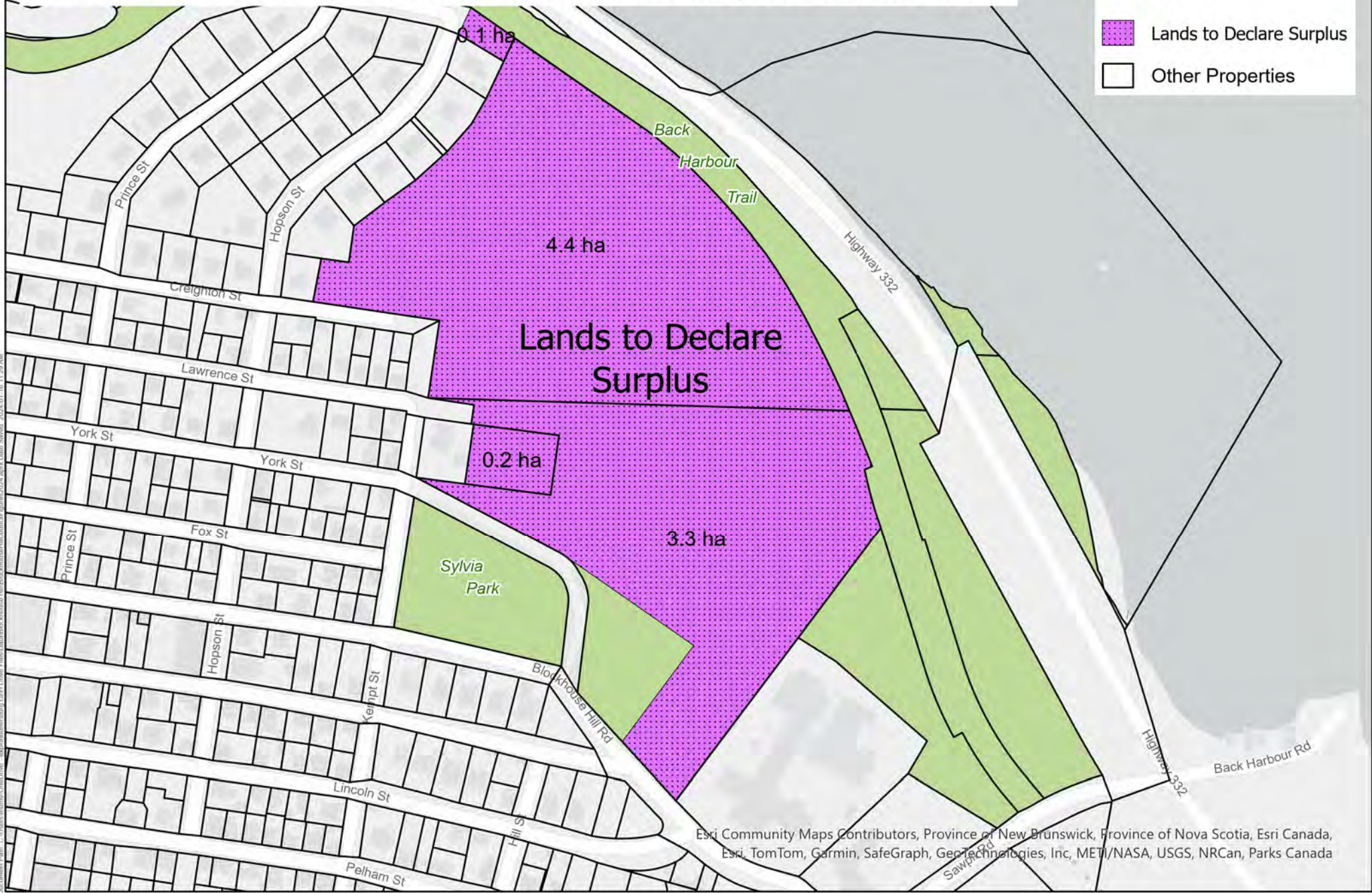
## TOWN OF LUNENBURG Lands to Declare Surplus - Option 2



# ATTACHMENT "B"- Lands to Declare Surplus Following Option 1: Town Square

**Legend**

-  Lands to Declare Surplus
-  Other Properties



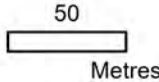
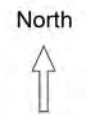
Esri Community Maps Contributors, Province of New Brunswick, Province of Nova Scotia, Esri Canada, Esri TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, NRCan, Parks Canada

Document Path: C:\Users\lunenburg\OneDrive - lunenburg.ca\Documents\lunenburg.ca\1 Drive Files\Quad\Borers\lunenburg\lunenburg2024.aprx Data Source: 2024.01.15 11:29 AM





Maps are for graphical purposes only. They do not represent a legal survey. While every effort has been made to ensure that these data are accurate and reliable within the limits of the current state of the art, the Town of Lunenburg cannot assume liability for any damages caused by any errors or omissions in the data. Users of our maps and other analysis products are solely responsible for interpretations made from these products.

## TOWN OF LUNENBURG Lands to Declare Surplus - Option 1



# ATTACHMENT "C"- Lands to Declare Surplus Following Option 3: Commons Crescent

## Legend

-  Lands to Declare Surplus
-  Other Properties



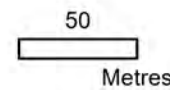
Esri Community Maps Contributors, Province of New Brunswick, Province of Nova Scotia, Esri Canada, Esri TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, NRCan, Parks Canada

Document Path: C:\Users\jdoyle\Desktop\GIS\Projects\GIS\MapServer\2024\_01\_15\_11:32 AM



Maps are for graphical purposes only. They do not represent a legal survey. While every effort has been made to ensure that these data are accurate and reliable within the limits of the current state of the art, the Town of Lunenburg cannot assume liability for any damages caused by any errors or omissions in the data. Users of our maps and other analysis products are solely responsible for interpretations made from these products.

## TOWN OF LUNENBURG Lands to Declare Surplus - Option 3



## Attachment D - Design Options Visuals



Option 1: Town Square



Option 2: Out of Sight



Option 3: Commons Crescent



Option 4: Park



Option 1: Town Square



Option 2: Out of Sight



Option 3: Commons Crescent



Option 4: Park



Option 1: Town Square



Option 2: Out of Sight



Option 3: Commons Crescent



Option 4: Park

**Attachment E - Design Options Comparison Chart**

	<i>Option 1</i>	<i>Option 2</i>	<i>Option 3</i>	<i>Option 4</i>
<i>Unit Count</i>	368	256	170	0
<i>Cost</i>	\$182,296,400	\$128,371,300	\$89,962,800	N/A
<i>Cost for Plant Upgrades</i>	\$10,533,000	\$5,333,000	\$5,175,000	N/A
<i>Public Green Space</i>	36%	53%	75%	100%
<i>Land Use Planning</i>	✓	✓	✓	Vacant
<i>Circulation</i>	Creighton to Sawpit Hopson Loop to Sawpit Green Corridors	Creighton to Sawpit Hopson Loop to Sawpit Green Corridors	Hopson Loop to Sawpit Trails Possible Addition	Trails Possible Addition
<i>Archaeological Impact</i>	Mitigation	No impact	No Impact	No Impact
<i>Heritage Impact</i>	Moderate	No impact	No Impact	Moderate

# FINAL REPORT

PRESENTATION OF DEVELOPMENT OPTIONS

January 16th, 2024

## BLOCKHOUSE HILL DEVELOPMENT

TOL2023001

Mackay-Lyons Sweetapple Architects

Lunenburg, Nova Scotia





# TABLE OF CONTENTS

<b>1. CONSULTANT DIRECTORY</b>	<b>5</b>
<b>2. EXECUTIVE SUMMARY</b>	<b>7</b>
<b>3. UNESCO WORLD HERITAGE SITE DESIGNATION</b>	<b>9</b>
<b>4. DEVELOPMENT OPTIONS</b>	<b>13</b>
4.1 GENERAL OBSERVATIONS	
4.2 OPTION 1: TOWN SQUARE	
4.3 OPTION 2: OUT OF SIGHT	
4.4 OPTION 3: COMMONS CRESCENT	
4.5 OPTION 4: PARK	
4.6 SUMMARY	
<b>APPENDIX</b>	<b>51</b>
A. CLASS D ESTIMATES	
B.1 SERVICING SCHEMATICS	
B.2 SERVICING REVIEW LETTER	
C. WATER + WASTE WATER TREATMENT PLANT IMPACT REPORTS	
D. DRAFT ARCHAEOLOGY RESOURCE IMPACT REPORT [WITHHELD]	

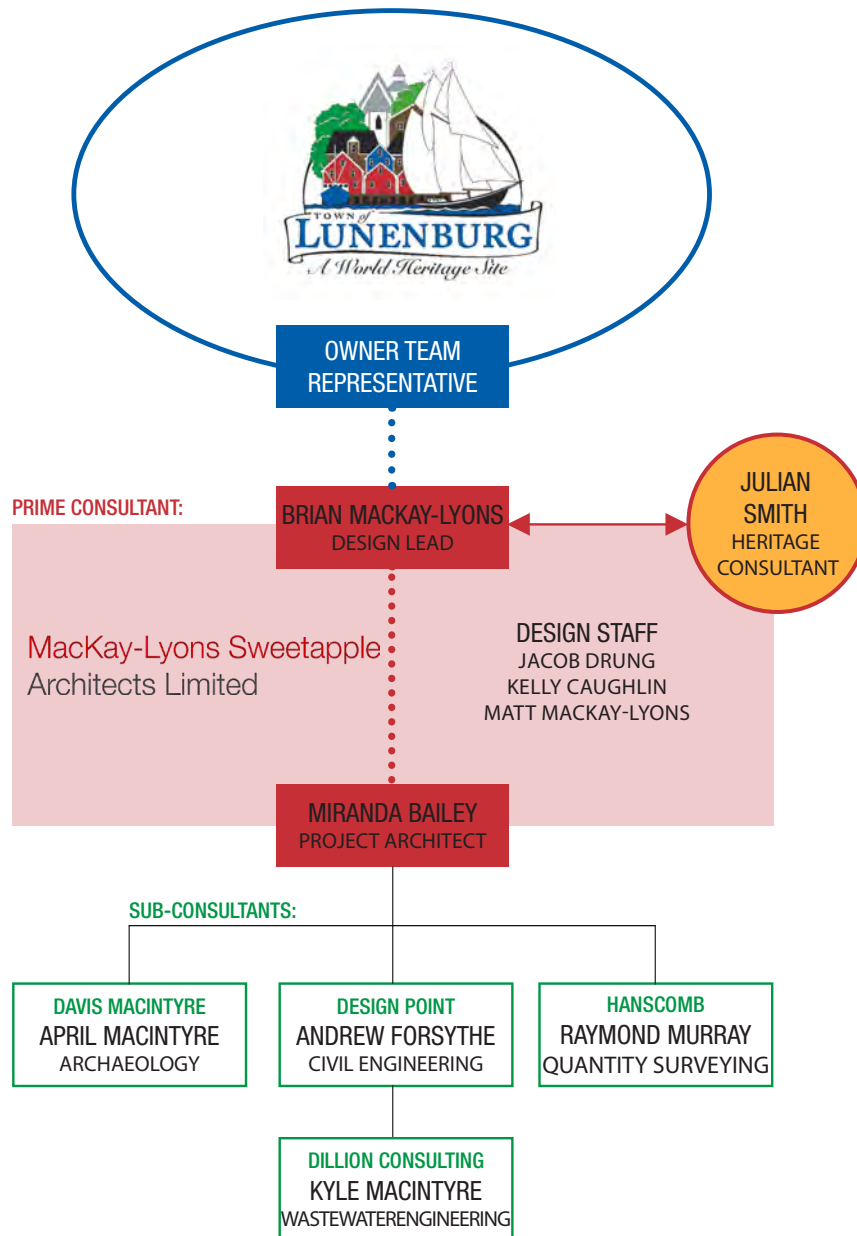


Fig. 1.1: Team Organizational Chart

# 1.0 CONSULTANT DIRECTORY

---

## PRIME CONSULTANT

*MacKay-Lyons Sweetapple Architects  
Lunenburg, NS  
<https://www.mlsarchitects.ca/>*

Brian MacKay-Lyons  
Miranda Bailey

## HERITAGE CONSULTANT

*Julian Smith Architects  
Westport, ON  
<http://www.juliansmitharchitects.ca/>*

Julian Smith

## CIVIL ENGINEERING

*Design Point  
Bedford, NS  
<https://www.designpoint.ca/>*

Andrew Forsythe

## WATER TREATMENT

*Dillion Consulting  
Halifax, NS  
<https://www.dillon.ca/>*

Kyle MacIntyre  
Katherine MacCaul

## ARCHAEOLOGY

*Davis MacIntyre  
Dartmouth, NS  
<https://www.davismacintyre.com/>*

April MacIntyre  
Courtney Glen

## COST ESTIMATING

*Hanscomb  
Halifax, NS  
<https://hanscomb.com/>*

Raymond Murray

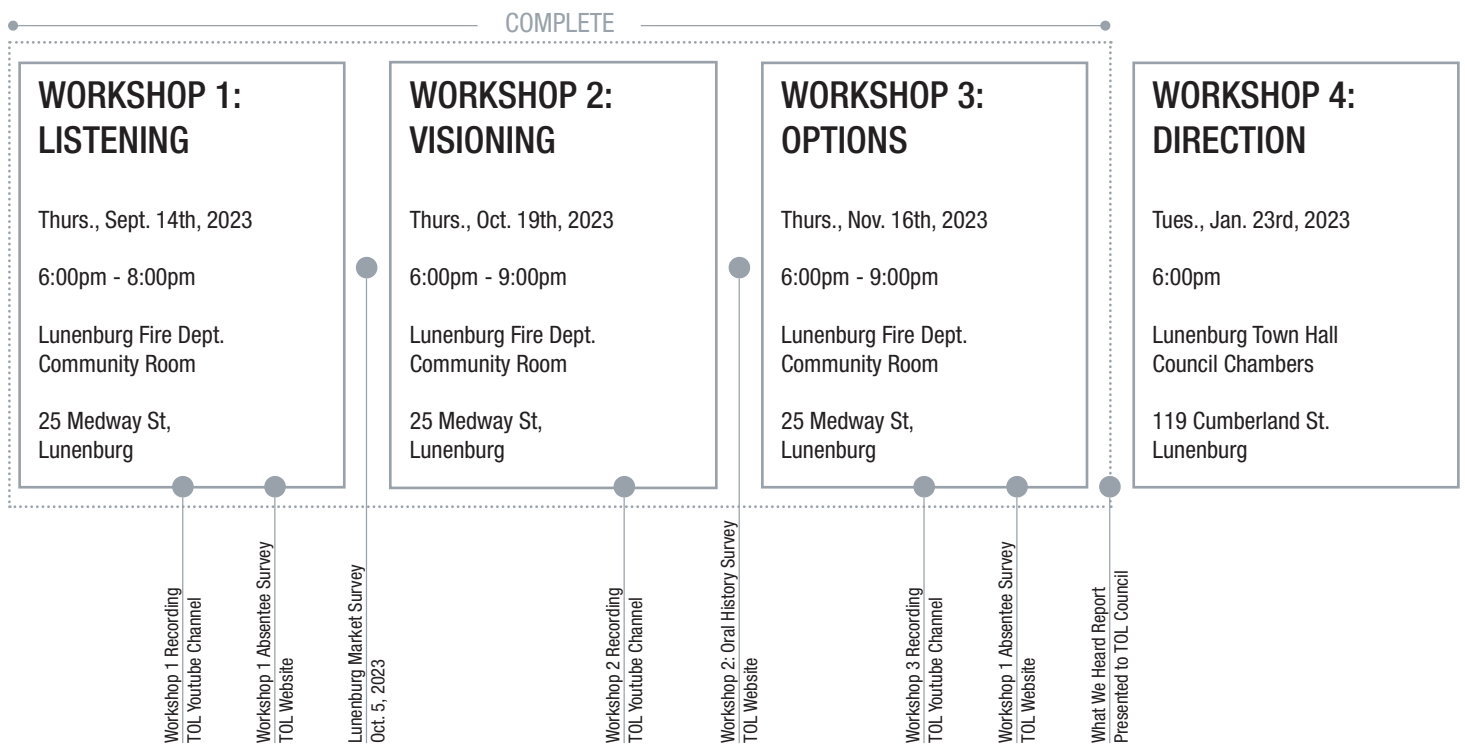


Fig. 2.1: Schedule diagram for Blockhouse Hill Project.

# 2.0 EXECUTIVE SUMMARY

---

The process of creating the four development schemes for Blockhouse Hill started with gathering existing site information and history, gaining feedback from the public through three engagement sessions, analyzing this feedback, and ensuring that all development options meet the current zoning by-laws. From public feedback during workshop 1, it was decided that the fourth option would be for the site to remain as is, with no housing development. Additional feedback from the three workshops directly impacted the design options in terms of unit types, green space, connectivity and buffer space. For more information on the workshops and feedback analysis please refer to the “What We Heard Report”.

We set out to provide the Town of Lunenburg with four distinctly differently, well designed development options. The options vary in terms of street layout, unit count, open green space, and connectivity for vehicles and pedestrians. As outlined in the proposal, the following has been produced for each development options presented in this report:

- 4 development schemes (sketches, plans, and 3D massing);
- 3D imagery for each scheme;
- preliminary servicing schematics, grading review, and street layouts for each scheme;
- preliminary cost estimates (rough order of magnitude) for each scheme;
- the Category C Archaeological Reconnaissance Study;
- and background data review, existing facility capacities, and recommended upgrades for the Water and Wastewater Treatment Plant.

*Please note, as Option 4 has no development proposed, no costing has been included for this option. Further study would be required should the Town wish to expand the park or landscape features in this option, which is beyond the scope outlined in the RFP and would require a licensed landscape architect to complete this work.*

Once a direction is provided by Town Council, the design team will produce a draft covenant for the development option selected.



# 3.0 UNESCO WORLD HERITAGE SITE DESIGNATION

---

## 3.1 HERITAGE DESIGNATION

### 3.1.1. UNESCO Designated Area:

The area designated by UNESCO is shown in yellow on the map opposite (Fig. 3.1). It is 33.85 hectares in area. It is the only area in the town recognized by UNESCO as having Outstanding Universal Value. As clearly stated in the UNESCO designation, “Within the boundaries of the 33.85 ha property are located all the elements necessary to express the Outstanding Universal Value of Old Town Lunenburg.”

The two primary qualities that sustain Lunenburg’s value, according to the designation, are its original layout and its overall appearance. The original layout is characterized by the rectangular grid pattern, characteristic of British colonial settlements, and the overall appearance is characterized by a sustained vernacular tradition of wooden houses and public buildings. Another characteristic noted in the designation is the importance of the offshore Atlantic fishery, although UNESCO recognizes that the fishery is currently undergoing irreversible change.

### 3.1.2 UNESCO BUFFER ZONE:

UNESCO has also identified a buffer zone around the designated property. The buffer zone is shown in green in the map opposite. It includes Blockhouse Hill.

The buffer zone in Lunenburg is not identified by UNESCO as having any values supporting the designation. Quite the opposite – UNESCO states that “the complete representation of the features and processes that convey the property’s significance” is contained within the designated area of Old Town (the yellow area on the map).

In part, this is because UNESCO is careful in limiting its designations to areas of high integrity and authenticity. The common lands, which are in the buffer zone, do not retain either the forms or functions of their original agricultural uses, nor the physical remains of the original fortifications.

### 3.1.3 IMPLICATIONS FOR BLOCKHOUSE HILL:

The purpose of a buffer zone, as defined by UNESCO, is not to convey heritage value, but “for the purposes of the effective protection of the nominated property”. This means that any development of Blockhouse Hill should help protect the identified values – particularly the original layout and the overall appearance – of Old Town Lunenburg.

The two most common concerns for UNESCO, when dealing with buffer zones, are visual impact and functional impact.

In terms of visual impact, the most frequent item brought before the World Heritage Committee is high-rise development adjacent to designated areas. This has caused significant discussion in cities such as St. Petersburg and Vienna. The primary concern is when the historic views are significantly impacted or entirely blocked by new buildings. In terms of functional impact, the most frequent concern is the displacement of traditional residents and community activities by increased tourism. This has caused significant discussion, including threats to remove the UNESCO designation, in places such as Venice.

The implications of these concerns for Blockhouse Hill include the following:

- In relation to visual impact, no new developments on Blockhouse Hill should negatively affect the views within Old Town Lunenburg or towards the town from the Front Harbour. The safest way to meet this criteria is to ensure that no new buildings rise above Sylvia Park when viewed from the harbour, or are visible along the primary street corridors of Old Town.
- In relation to functional impact, any new developments should help sustain a healthy community. This includes addressing the impacts of tourism on the availability of affordable housing and community services.

## 3.2 RELATION TO DEVELOPMENT

The following notes highlight the UNESCO World Heritage designation as it relates to the proposed development options:

- some development of affordable housing would meet UNESCO's most serious concern about World Heritage sites - namely, the transition of once-healthy and diverse communities into tourism magnets that cater more to visitors and wealthier land-owners.
- the development proposals leave the original grid of Old Town Lunenburg intact, as a visually distinct area. The links to new development are minimal and discreet. The continuity of imageability of the Old Town grid is an important aspect of the UNESCO designation, and was clearly evident in the mental maps that were submitted in workshop 1.
- the development proposals also leave intact the main function of the buffer zone, which is to provide a compatible visual and functional backdrop to the Old Town area. None of the options introduce any visual intrusion into the views into or out of Old Town. And they leave intact the two most important features - the Academy to the west, and the Blockhouse to the east - each with its own surrounding open space.

*Note About the Author of Section 3:*

*Julian Smith was a founding member of ICOMOS Canada and is its current Past President. He has led the Canadian delegation to a number of ICOMOS General Assemblies. He has undertaken the evaluation of potential World Heritage Sites for ICOMOS, and has been invited by ICOMOS Committees in a number of countries to advise on the treatment of World Heritage Sites.*

*For UNESCO, Julian Smith was a co-author of UNESCO's Recommendation on the Historic Urban Landscape. He was also lead author for UNESCO's North American Report on Culture, Heritage and Sustainability, part of the lead-up to the UN Habitat III conference in Quito in 2016. As Director of Willowbank, Julian established a Memorandum of Understanding with the World Heritage Centre of UNESCO, to allow academic exchange and the provision of consulting services.*



Fig. 4.1: Drone photo of Blockhouse Hill site, 2023. Photo by MLSA.

# 4.0 DEVELOPMENT OPTIONS

---

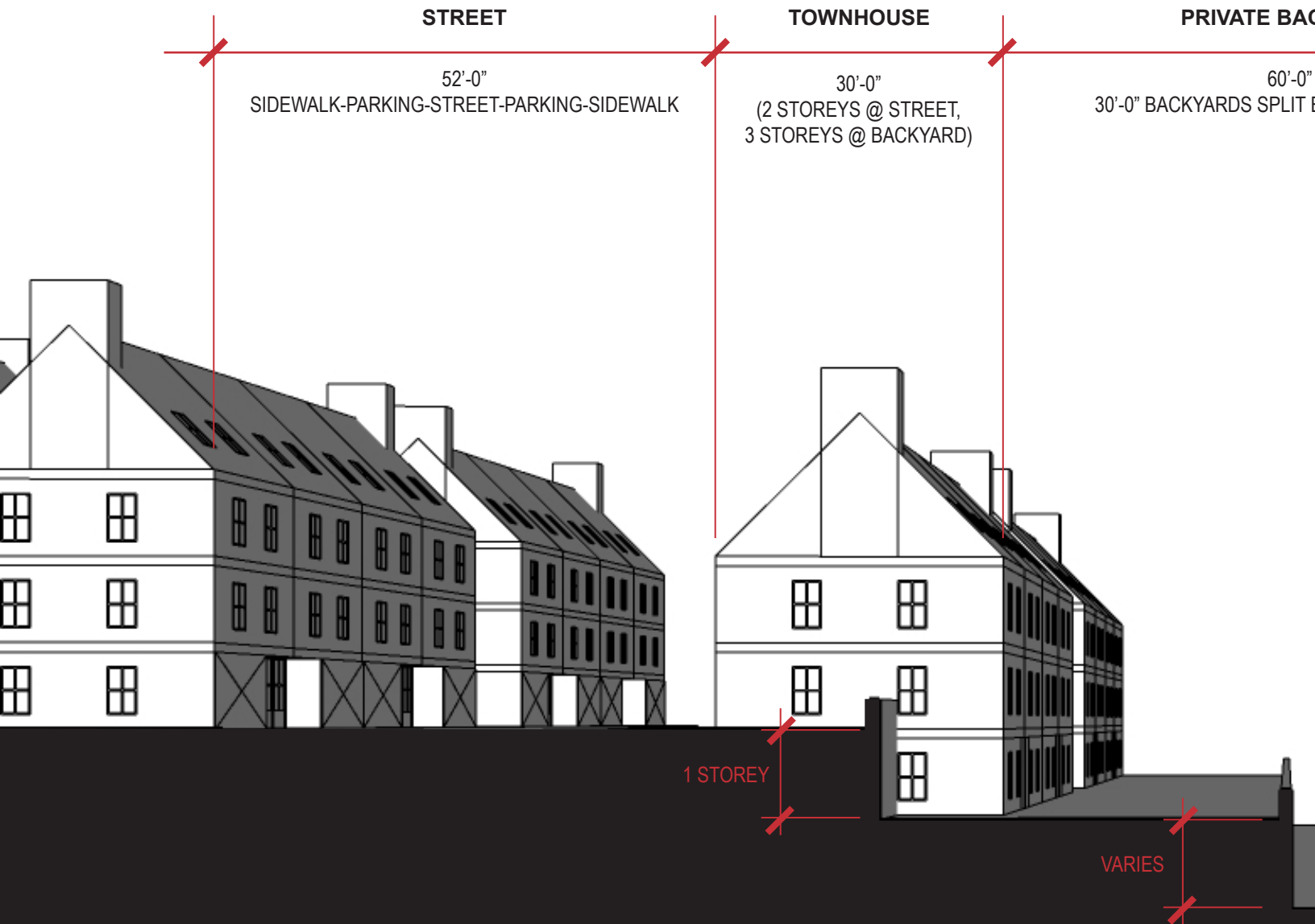
## 4.1 GENERAL OBSERVATIONS

The following sections outline our design approach and overall strategy to developing four distinct design options on the Blockhouse Hill site. These notes and observations are not specific to one of the options but apply to all options showing housing development on the site.

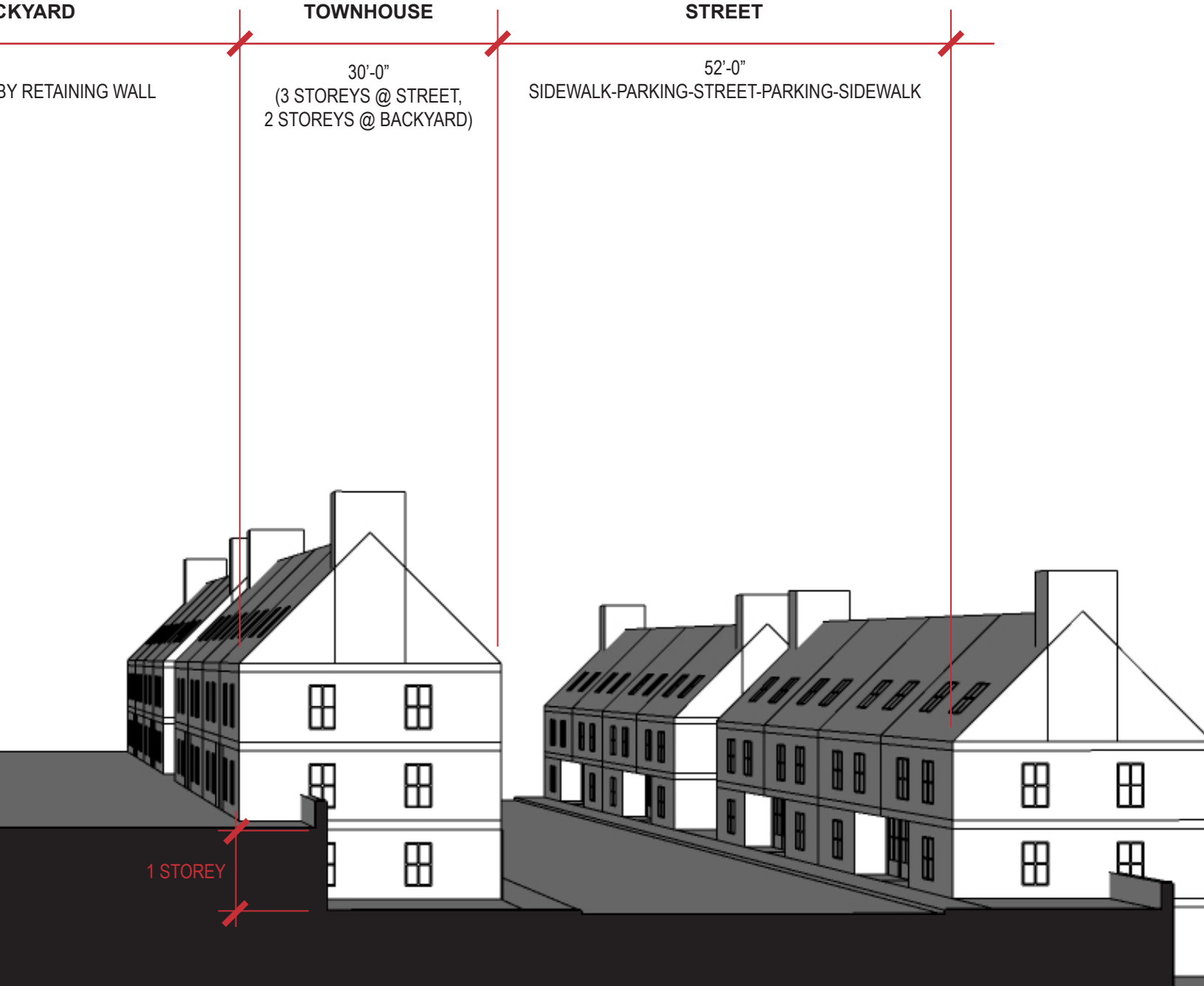
### 4.1.1 APPROACH TO SITE SLOPE

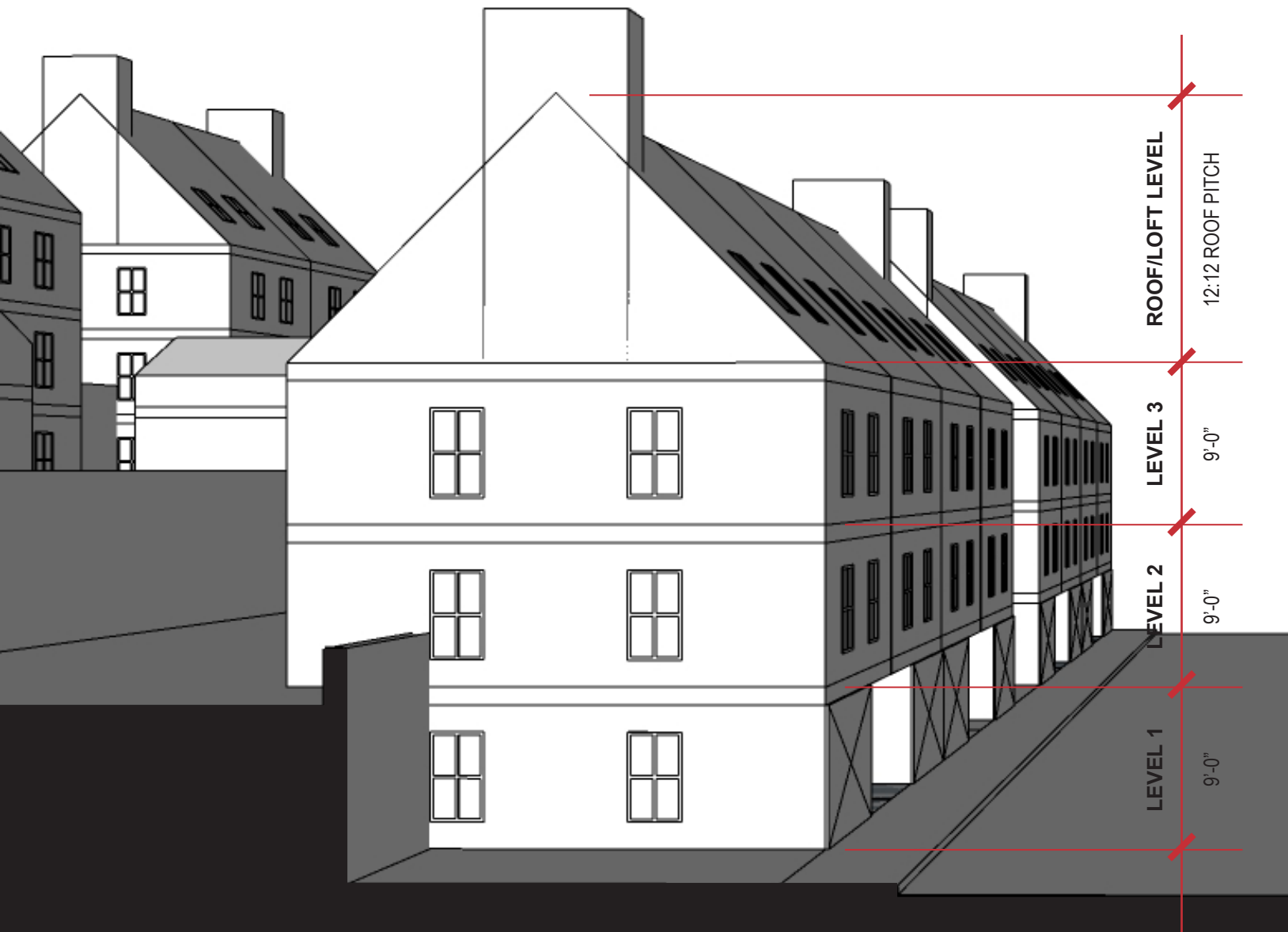
One of the unique features and challenges of the Blockhouse Hill site was finding a way to position buildings and roads on such a steep slope. Roads perpendicular to the hill were too steep for vehicular traffic. This required the primary network of streets to run with the contours, horizontally along the hill. When a typical historic Lunenburg town block, with a depth of 120' from street to street, is placed on the site, it generates a grade change of approximately 3 storeys. Along with the challenges, there are benefits to this significant grade change including, the views gained by stepping the housing blocks down the hill and an increased number of at-grade units available, as the backyard is a storey different than the street-facing unit. Refer to figures 4.2 and 4.3 for typical section diagrams illustrating how housing on the hill works with the slope.

As the perpendicular streets were too steep for vehicular traffic they were replaced by green streets or green corridors. These green streets provide several benefits to the development, as they break up longer stretches of road by creating the rhythm of a shorter block pattern, similar to how a vehicular intersection would indicate the end of a block. Second, the green corridors are useful for drainage across the site, providing natural greenery and soft landscaping to help with water run off. Finally, they provide a network of open space for walking trails throughout the development. Together, these pathways will provide a connection between Sylvia Park at the top of the hill and the Bay-to-Bay trail at the base of the hill.



**FIG. 4.2: SLOPE CHANGE FROM STREET TO STREET**





**FIG. 4.3: HOUSING FACING THE STREET**



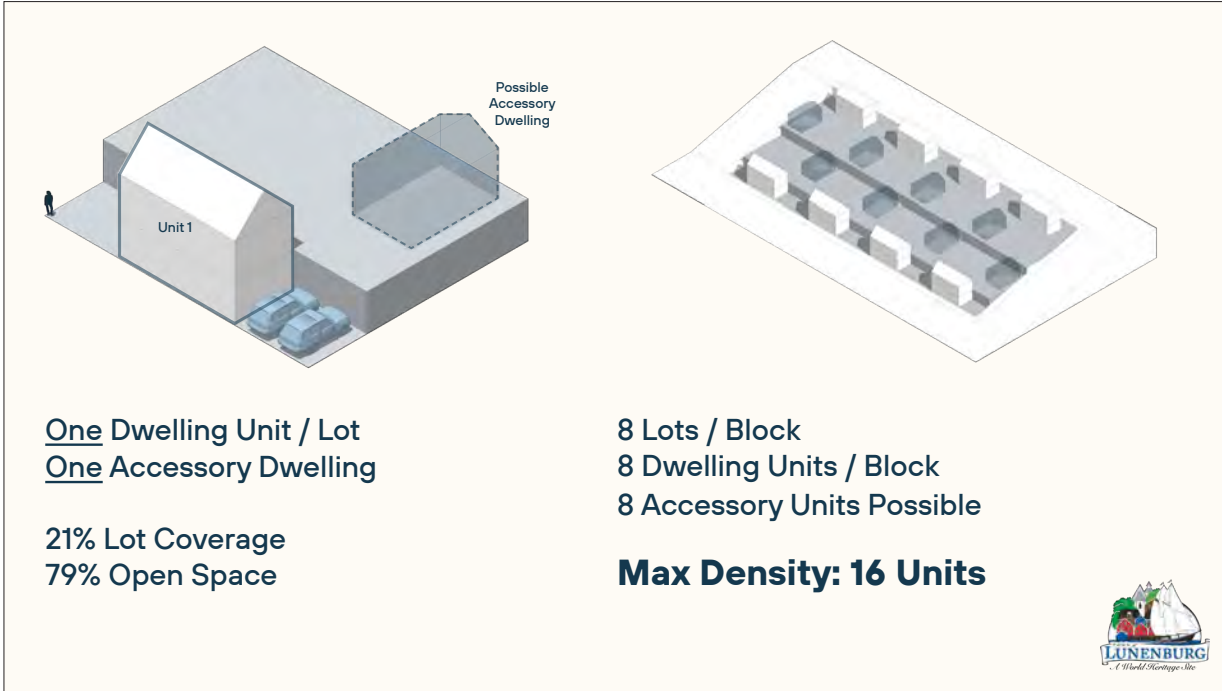


Fig. 4.4: RL - Residential Low Density Zoning Typologies: Single Detached Houses - 1 per lot

### 4.1.2 HOUSING TYPOLOGIES

A variety of housing types which meet existing zoning requirements were explored in this study, including, single detached homes, semi-detached/duplexes, accessory dwelling units, townhouses, and apartment buildings. These housing types were presented in Workshop 3 and feedback on type preference was collected from participants. Notably, participants that were interested in seeing development on the site generally preferred higher density housing on the blocks. Collectively, the feedback from the block exercise helped inform which building typologies were shown in the final four development options. For more information on the results and analysis from Workshop 3 refer to the “What We Heard Report”.

In all development options, single detached homes with optional ADUs, shown in Figure 4.4, were maintained in the Residential Low Density Zone only (along Lawrence St). In the Residential Medium Density Zone, single detached homes were forgone in favour of semi-detached/duplexes with optional backyard accessory dwelling units (ADUs). This typology, as shown in Figures 4.5 and 4.6, maximizes the medium density zoning by having up to 5 units per lot with a lot coverage of 40%. Townhouses allow for the highest density and are concentrated in the Residential High Density Zone. Figures 4.7 and 4.8 illustrate how two of the same building forms/types, can hold a different number of units.

### 4.1.3 UNIT TYPES AND BREAKDOWNS

The quantities of each unit type, 1-bedroom, 2-bedroom, and 3-bedroom, were determined based on the estimated demand projected in the Town of Lunenburg’s Municipal Housing Needs Report, 2023. Table 4.1 in the report indicates the total number of units required by 2027 to be: 35 Studio/1-bedroom, 50 2-bedroom, and 35 3+ bedroom. This works out to a percentage of 29% Studio/1-bedroom units, 42% 2-bedroom units, and 29% 3-bedroom units. These percentages were used as targets for the total quantities of each unit type included in Options 1,2 and 3. For the purposes of applying these percentages, we took the ADUs (accessory dwelling units) out of the count and considered them to be an optional studio or 1 bedroom unit. To calculate population estimates for the development, it was assumed that 2 people would occupy a studio or 1-bedroom unit, 3 people in a 2-bedroom unit, and 4 people in a 3-bedroom unit.

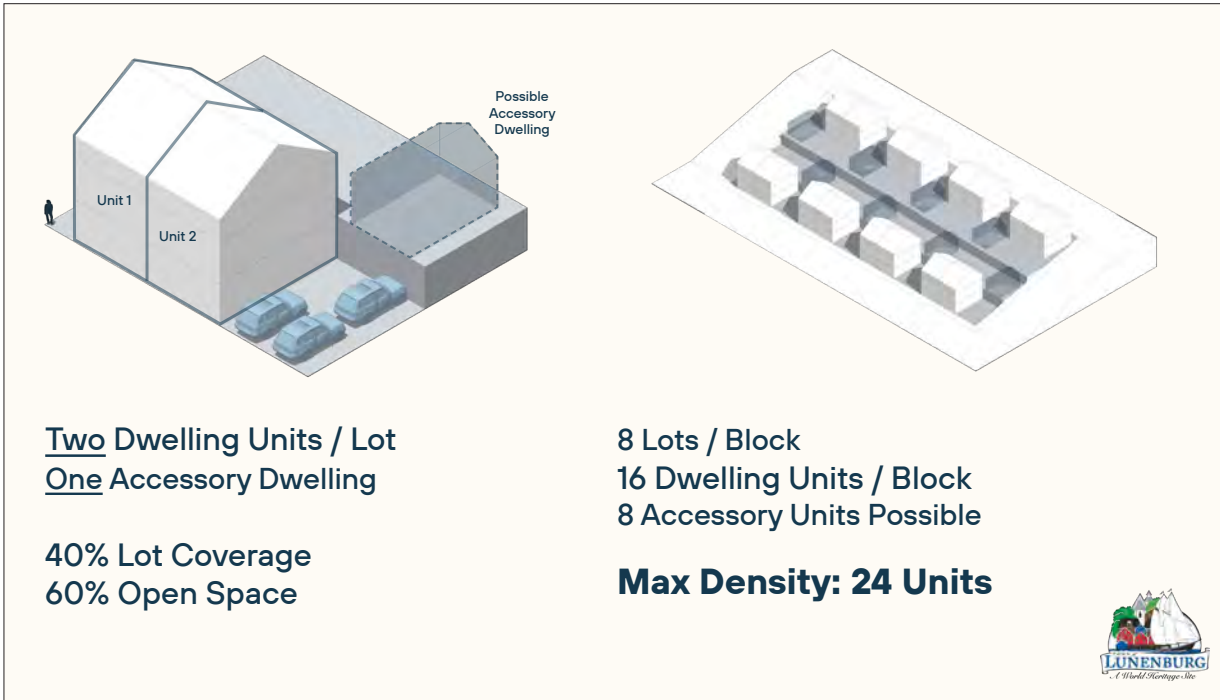


Fig. 4.5: RM - Residential Medium Zoning Typologies: Semi-Detached/Duplex Housing

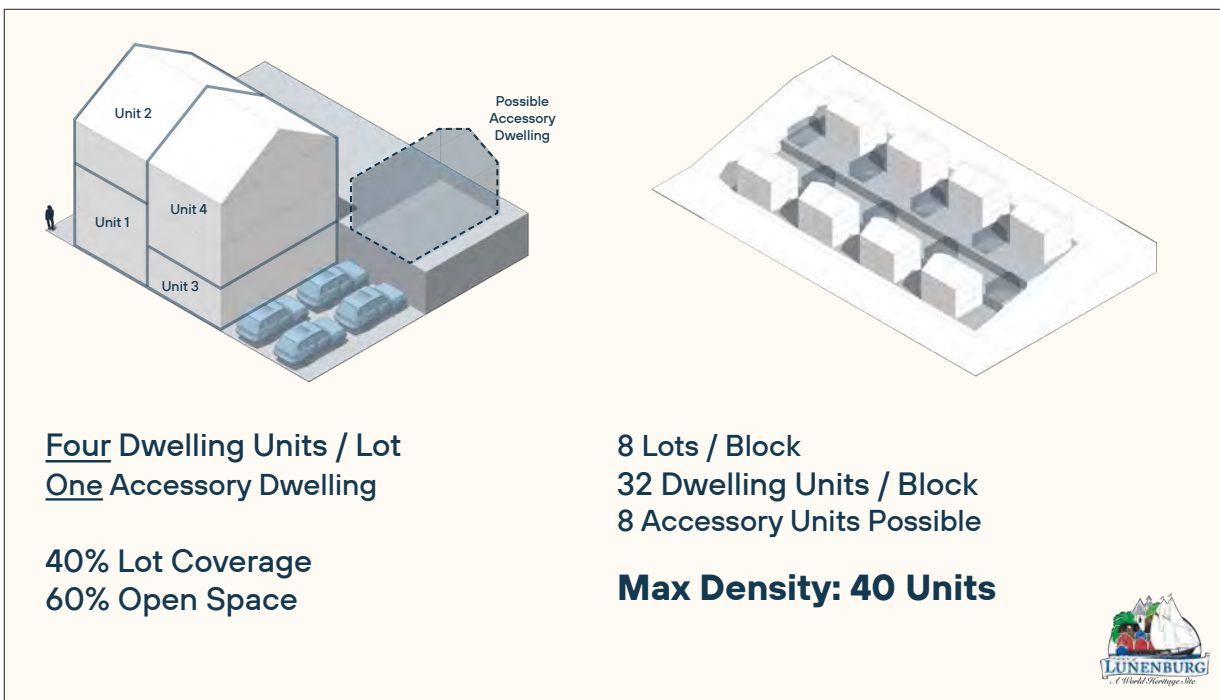


Fig. 4.6: RM - Residential Medium Zoning Typologies: Semi-Detached/Multi-Unit Housing

#### **4.1.4 POTENTIAL ZONING AMENDMENTS**

It is important to note that all development options meet the current use zoning, lot zoning, and form zoning requirements.

Should council wish to amend the zoning, each option could have an increased number of units. Specifically, where medium density is shown in Options 1 and 2, the minimum lot size restricts density and the number of units to 4 per lot plus an ADU, which could be increased. Additionally, if the Town wishes to change the target quantity of 1, 2, and 3-bedroom units, this will also shift the total number of units in Options 1, 2 and 3.

In regard to use zoning, numerous Workshop 3 participants emphasized a desire for any new development to include other amenities such as corner stores, cafes and community spaces, that are not currently permitted by residential zoning restrictions.

#### **4.1.5 CONCEPTUAL RENDERINGS**

The conceptual renderings included in this report are to provide a general impression of the neighbourhood. The design of the housing has not been completed at this time. The illustrations show how the housing meets the street, the overall massing of the development, street widths, and pedestrian pathways.

#### **4.1.6 WATER AND WASTE WATER TREATMENT UPGRADES**

In parallel to developing options for the Blockhouse Hill site, Dillon Consultants conducted a review of the Water and Waste Water Treatment Plants to study the impact of any new development. The upgrades recommended for the water and waste water treatment plants have only minor variations between options 1, 2, 3, and 4. The upgrades are primarily based on Lunenburg's population growth. Refer to Appendix B for complete report.

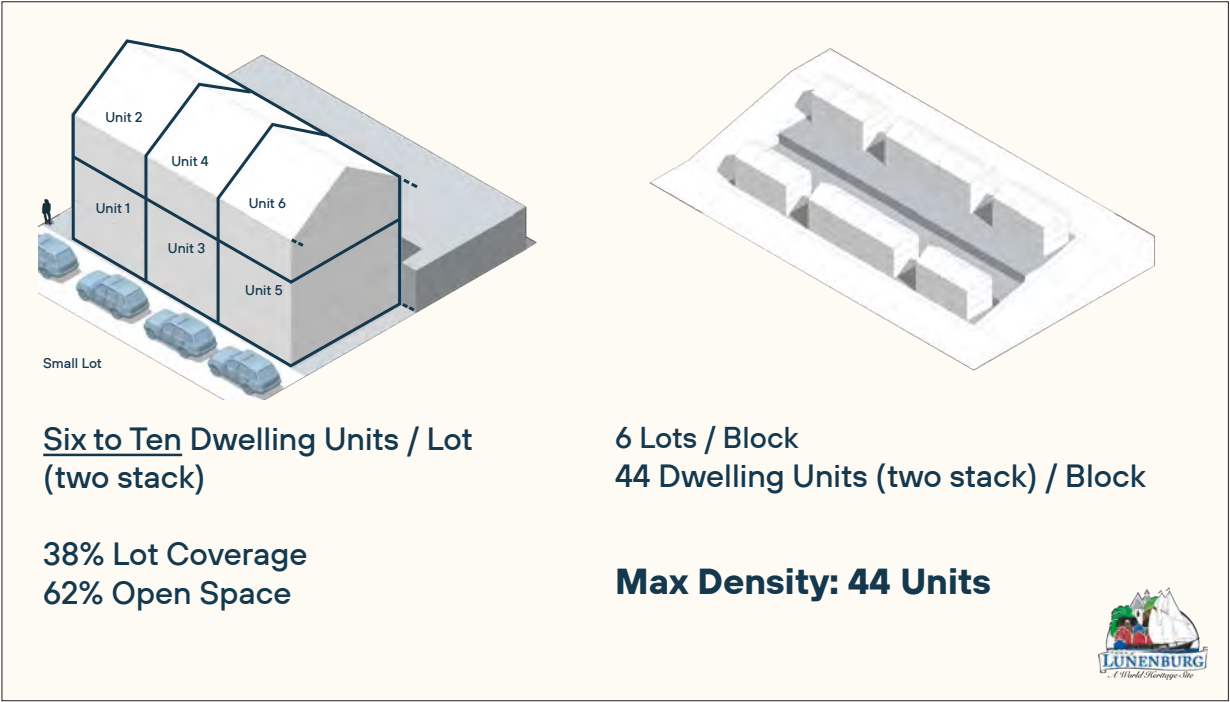


Fig. 4.7: RH - High Density Stacked Townhouses (2 units stacked)

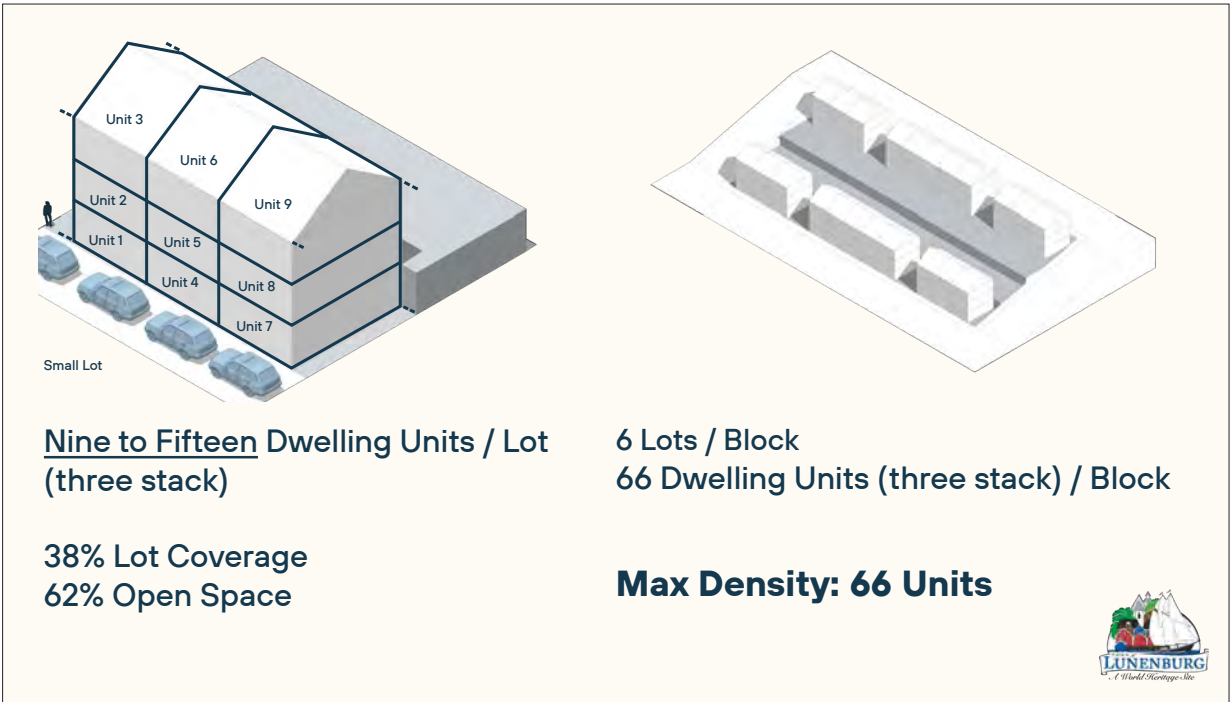


Fig. 4.8: RH - High Density Stacked Townhouses (3 units stacked)

#### **4.1.7 ARCHAEOLOGICAL IMPACT STUDY**

Results from the archaeological impact study can be found in Appendix D. Only one of the development options required additional archaeological testing and therefore an allowance has been carried for this work.

#### **4.1.8 PHASING STRATEGY**

Each of the four options are illustrated showing a full build/complete development. All of the development options could be phased over several years to match the growth demand for the Town of Lunenburg. Phasing was removed from this stage of the analysis to more easily compare the four options.

#### **4.1.9 CLASS D ESTIMATES**

A Class D Estimate/ Rough Order of Magnitude has been produced for each of the development options. All estimates have been completed in current dollar amounts to more fairly compare the four design options, escalation has not been included. Refer to Appendix A for cost estimates. A summary of the estimates is also included in section 4.6.



Fig. 4.9: Development Option 1 - Town Square

# 4.2 OPTION 1: TOWN SQUARE

## 4.2.1 CONCEPT

Option 1: Town Square is the highest density option of all the development schemes. A large green space is maintained at the top of the hill, adjacent to Sylvia Park. Oxner Dr. has been extended to become the primary street, connecting the base of the hill to Blockhouse Hill Rd. at the top of the hill. Creighton St., Lawrence St., and York St. were also extended to connect with the Oxner Dr. extension. To increase density on the hill, two cul-de-sacs were added in the higher density zoning area called Street A and Street B.

Green streets help maintain the rhythm of a typical block and provide pedestrian pathways down the hill. These streets are too steep for vehicular travel. At a minimum, 1 of the pathways down the hill will be fully accessible, while the other pathways can be narrower and have stairs. When the green streets cross over the vehicular streets, the curbs will curve inward, narrowing the road to slow traffic at each pedestrian crosswalk. An allowance has been carried in the estimate for trails and pedestrian walkways as they have not been formally designed at this point.

<b>ROAD/SIDEWALK:</b>	<b>28%</b>
<b>PARK:</b>	<b>36%</b>
<b>BACKYARDS:</b>	<b>22%</b>
<b>TOTAL OPEN SPACE:</b>	<b>86%</b>
<b>HOUSES:</b>	<b>14%</b>

## 4.2.2 STREET LAYOUT + PARKING

York St. and Oxner Dr. will only have housing and sidewalks on one side of the street. All new power for the development will be underground. Streetlights will be required and street parking has been accounted for on both sides of the street.

Refer to Appendix B for servicing schematics.







-  TOWNHOUSE
-  SEMI-DETACHED/ DUPLEX
-  SINGLE DETACHED HOME
-  ACCESSORY DWELLING UNIT
-  NATURAL GREEN SPACE
-  PARK GREEN SPACE
-  PRIVATE YARDS



Fig. 4.10: Aerial View Conceptual Rendering of Development Option 1 - Town Square

OPTION 1: TOWN SQUARE						
TYPE	# PER TYPE	STUDIO / ADU	1 BED	2 BED	3 BED	TOTAL # UNITS
SINGLE DETACHED HOMES	3	0	0	0	3	3
ACCESSORY DWELLING UNITS	50	50	0	0	0	50
SEMI-DETACHED/ DUPLEXES	104	0	0	116	46	162
TOWNHOUSES	82	0	93	18	42	153
<b>TOTAL</b>	<b>239</b>	<b>50</b>	<b>93</b>	<b>134</b>	<b>91</b>	<b>368</b>
PERCENTAGE			29.25%	42.14%	28.62%	100%

**4.2.3 UNIT COUNT BREAKDOWN**

In total, there are 3 single family homes, 50 accessory dwelling units, 104 semi-detached/duplexes, and 82 townhouses. Following the desired unit quantity ratios projected in the Lunenburg housing needs report, this generates a total of 50 studio/accessory dwelling units, 93 1-bedroom units, 134 2-bedroom units, and 91 3-bedroom units. The total number of units in this option to 368.



Fig. 4.11: Street View Conceptual Rendering of Development Option 1 - Town Square



Fig. 4.12: Base of Hill View Conceptual Rendering of Development Option 1 - Town Square



Fig. 4.13: View from Bay to Bay Trail looking up to Sylvia Park. Conceptual Rendering of Development Option 1 - Town Square

#### 4.2.4 OTHER REQUIREMENTS AND/OR EXCEPTIONS

An allowance was carried in this option for additional archaeological work required due to a small undisturbed high potential area. The recommendation is shovel testing at 5m intervals to look for the presence or absence of archaeological resources. Refer to Appendix D for the full Archaeological Resource Impact Study.



Fig. 4.14: View of Development from Back Harbour. Conceptual Rendering of Development Option 1 - Town Square



Fig. 4.15: Development Option 2 - Out of Sight

# 4.3 OPTION 2: OUT OF SIGHT

## 4.3.1 CONCEPT

Option 2: Out of Sight utilizes an even larger green space buffer at the top of the hill and only has development from Creighton St. down. The primary road in this option is Creighton St., which extends across the site to connect to Sawpit Rd. Oxner Dr. is also extended and turns to meet Creighton St. Similar to Option 1, two cul-de-sacs were added to increase the number of units in the high-density zoning area.

Green Streets cut through the development connecting Sylvia Park and the pedestrian trail at the bottom of the hill. These green streets provide breaks in the blocks as vehicular streets would not be possible at these slopes. At a minimum, 1 of the pathways down the hill will be fully accessible, while the other pathways can be narrower and have stairs. When the green streets cross over the vehicular streets, the curbs will curve inward, narrowing the road to slow traffic at each pedestrian crosswalk. An allowance has been carried in the estimate for trails and pedestrian walkways as they have not been formally designed at this point.

<b>ROAD/SIDEWALK:</b>	<b>20%</b>
<b>PARK:</b>	<b>53%</b>
<b>BACKYARDS:</b>	<b>18%</b>
<b>TOTAL OPEN SPACE:</b>	<b>91%</b>
<b>HOUSES:</b>	<b>9%</b>

## 4.3.2 STREET LAYOUT + PARKING

At the base of the hill, Oxner Dr. will only have housing and a sidewalk on one side of the street. Creighton St. will narrow as it approached the intersection with Sawpit Rd as there is no housing directly adjacent. Aside from these locations, streets will be wide enough to support parking on both sides. Power will run underground and streetlights will be included on all streets. One power pole will need to be relocated due to the alignment of Creighton St. as it approaches Sawpit Rd., the cost of which has been included in the estimate.

Refer to Appendix B for servicing schematics.





-  TOWNHOUSE
-  SEMI-DETACHED/ DUPLEX
-  SINGLE DETACHED HOME
-  ACCESSORY DWELLING UNIT
  
-  NATURAL GREEN SPACE
-  PARK GREEN SPACE
-  PRIVATE YARDS



Fig. 4.16: Aerial View Conceptual Rendering of Development Option 2 - Out of Sight

OPTION 2 - OUT OF SIGHT						
TYPE	# PER TYPE	STUDIO / ADU	1 BED	2 BED	3 BED	TOTAL # UNITS
SINGLE DETACHED HOMES	3	0	0	0	3	3
ACCESSORY DWELLING UNITS	26	26	0	0	0	26
SEMI-DETACHED/ DUPLEXES	54	0	0	60	24	84
TOWNHOUSES	80	0	66	38	39	143
<b>TOTAL</b>	<b>163</b>	<b>26</b>	<b>66</b>	<b>98</b>	<b>66</b>	<b>256</b>
PERCENTAGE			28.70%	42.61%	28.70%	100%

**4.3.3 UNIT COUNT BREAKDOWN**

In total there are 3 single family homes, 26 accessory dwelling units, 54 semi-detached/duplexes, and 80 townhouses. Following the desired unit quantity ratios projected in the Lunenburg housing report, this generates a total of 26 studio/accessory dwelling units, 66 1-bedroom units, 98 2-bedroom units, and 66 3-bedroom units. Total number of units for Option 2 is 256.



Fig. 4.17: Street View Conceptual Rendering of Development Option 2 - Out of Sight



Fig. 4.18: Base of Hill View Conceptual Rendering of Development Option 2 - Out of Sight



Fig. 4.19: View from Bay to Bay Trail looking up to Sylvia Park. Conceptual Rendering of Development Option 2 - Out of Sight

#### 4.3.4 OTHER REQUIREMENTS AND/OR EXCEPTIONS

Different from Option 1, Option 2 connects to Sawpit Rd. rather than Blockhouse Hill Rd. This will require the relocation of one power pole. The cost for this relocation has been carried in the estimate.



Fig. 4.20: View of Development from Back Harbour. Conceptual Rendering of Development Option 2 - Out of Sight

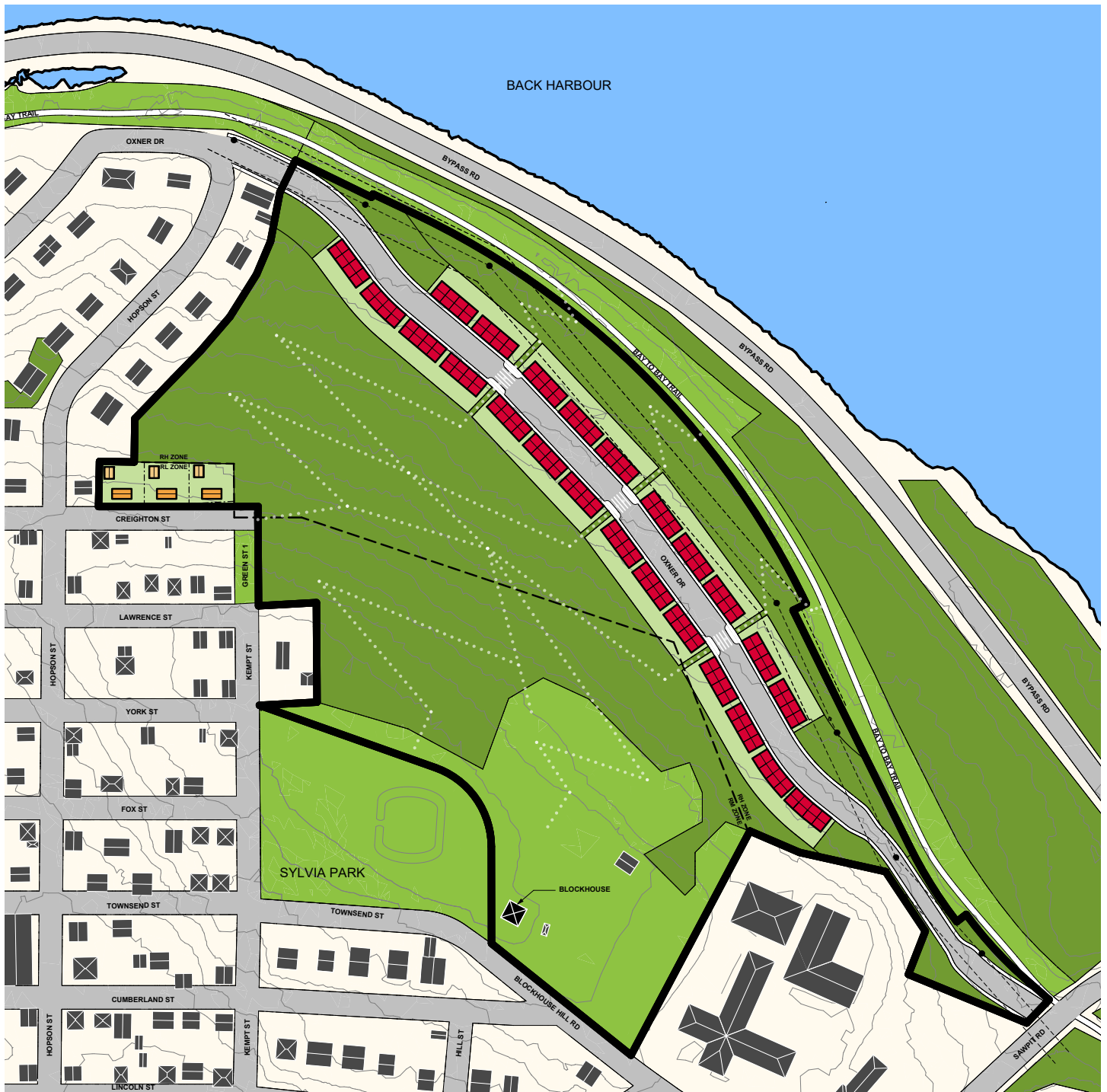


Fig. 4.21: Development Option 3 - Commons Crescent

# 4.4 OPTION 3: COMMONS CRESCENT

## 4.4.1 CONCEPT

Option 3: Commons Crescent maintains the largest amount of green space of any of the development options. All the housing in this option is located at the bottom of the hill along an extension of Oxner Dr., which stretches to intersect with Sawpit Rd. The housing zones are broken up into a series of smaller blocks using green streets, through which a series of pathways link Sylvia Park to the Bay-to-Bay trail. As in Options 1 and 2, 1 of the pathways down the hill will be fully accessible, while the other pathways can be narrower and have stairs. When the green streets cross over the vehicular streets, the curbs will curve inward, narrowing the road to slow traffic at each pedestrian crosswalk

## 4.4.2 STREET LAYOUT + PARKING

Similar to Options 1 and 2, all power will be underground. The Oxner Dr. extension will have streetlights, as well as parking and sidewalks on both sides of the street. The street will narrow at the connection to the existing Oxner Dr. and at the intersection of Sawpit Rd. Like Option 2, 1 power pole will need to be relocated.

Refer to Appendix B for servicing schematics.

<b>ROAD/SIDEWALK:</b>	<b>10%</b>
<b>PARK:</b>	<b>75%</b>
<b>BACKYARDS:</b>	<b>9%</b>
<b>TOTAL OPEN SPACE:</b>	<b>94%</b>
<b>HOUSES:</b>	<b>6%</b>








-  TOWNHOUSE
-  SEMI-DETACHED/ DUPLEX
-  SINGLE DETACHED HOME
-  ACCESSORY DWELLING UNIT
-  NATURAL GREEN SPACE
-  PARK GREEN SPACE
-  PRIVATE YARDS



Fig. 4.22: Aerial View Conceptual Rendering of Development Option 3 - Commons Crescent

OPTION 3: COMMONS CRESCENT						
TYPE	# PER TYPE	STUDIO / ADU	1 BED	2 BED	3 BED	TOTAL # UNITS
SINGLE DETACHED HOMES	3	0	0	0	3	3
ACCESSORY DWELLING UNITS	3	3	0	0	0	3
SEMI-DETACHED/ DUPLEXES	0	0	0	0	0	0
TOWNHOUSES	96	0	48	72	44	164
<b>TOTAL</b>	<b>102</b>	<b>3</b>	<b>48</b>	<b>72</b>	<b>47</b>	<b>170</b>
PERCENTAGE			28.74%	43.11%	28.14%	100%

**4.4.3 UNIT COUNT BREAKDOWN**

In total there are 3 single family homes, 3 accessory dwelling units, 0 semi-detached/duplexes, and 96 townhouses. Following the desired unit quantity ratios projected in the Lunenburg housing report, this generates a total of 3 studio/accessory dwelling units, 48 1-bedroom units, 72 2-bedroom units, and 47 3-bedroom units. Total number of units for option 3 is 170.



Fig. 4.23: Street View Conceptual Rendering of Development Option 3 - Commons Crescent



Fig. 4.24: Base of Hill View Conceptual Rendering of Development Option 3 - Commons Crescent



Fig. 4.25: View from Bay to Bay Trail looking up to Sylvia Park. Conceptual Rendering of Development Option 3 - Commons Crescent

#### 4.4.4 OTHER REQUIREMENTS AND/OR EXCEPTIONS

Should the town acquire the property adjacent to where the site narrows at the connection to Sawpit Rd., there may be space for additional housing on this stretch of the road.



Fig. 4.26: View of Development from Back Harbour. Conceptual Rendering of Development Option 3 - Commons Crescent



Fig. 4.27: Option 4 - Park

# 4.5 OPTION 4: PARK

## 4.5.1 CONCEPT

This development option has no units and keeps the park as is. The addition of any trails or a formally-designed park would require a separate landscape architectural design study and is beyond the scope of this project. There is no costing associated with this option.

<b>ROAD/SIDEWALK:</b>	<b>0%</b>
<b>PARK:</b>	<b>100%</b>
<b>BACKYARDS:</b>	<b>0%</b>
<b>TOTAL OPEN SPACE:</b>	<b>100%</b>
<b>HOUSES:</b>	<b>0%</b>







-  TOWNHOUSE
-  SEMI-DETACHED/ DUPLEX
-  SINGLE DETACHED HOME
-  ACCESSORY DWELLING UNIT
-  NATURAL GREEN SPACE
-  PARK GREEN SPACE
-  PRIVATE YARDS



Fig. 4.28: Aerial View Conceptual Rendering of Option 4 - Park.



**4.5.2 UNIT COUNT BREAKDOWN**

There are 0 units in this option. This option does not meet the housing demand outlined in the 2023 Town of Lunenburg Housing Needs report.

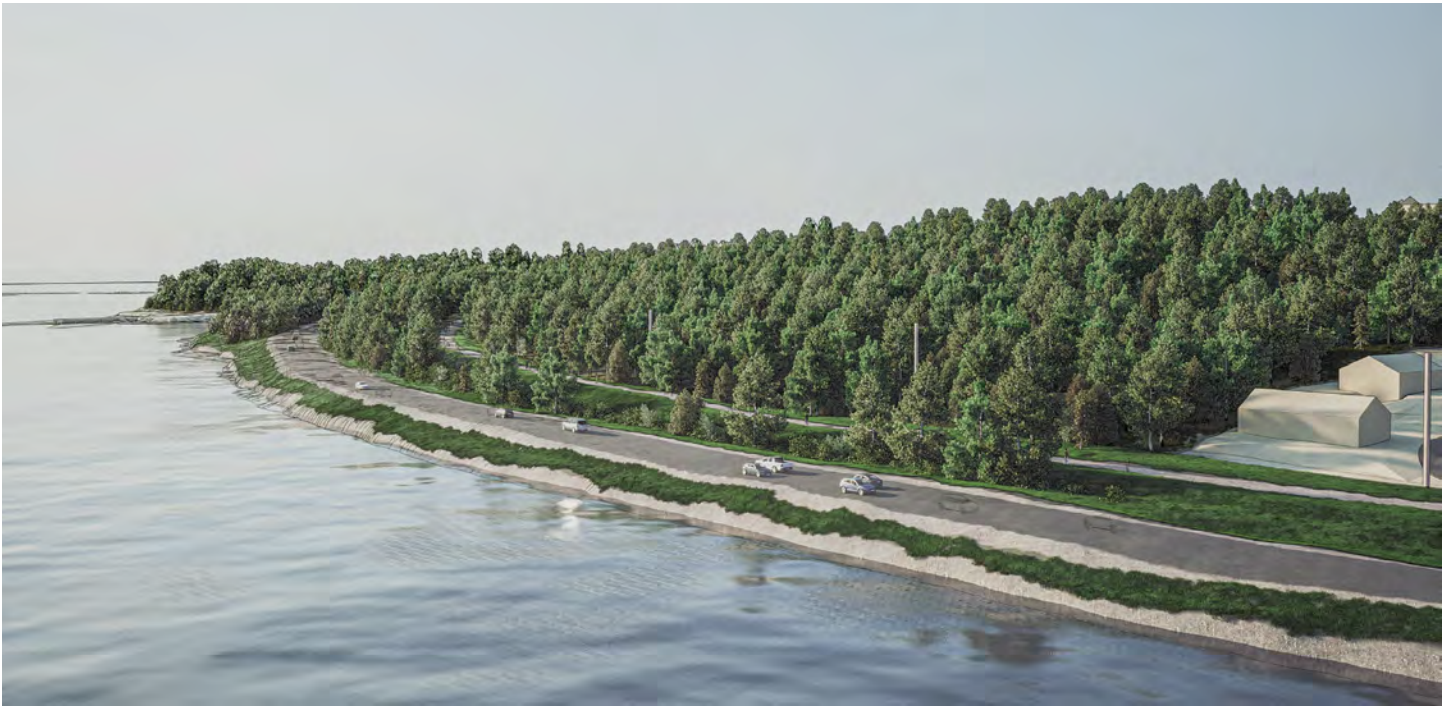


Fig. 4.29: Base of Hill View Conceptual Rendering of Option 4 - Park



Fig. 4.30: View from Bay to Bay Trail looking up to Sylvia Park. Conceptual Rendering of Option 4 - Park



Fig. 4.31: View of Development from Back Harbour. Conceptual Rendering of Option 4 - Park



## 4.6 SUMMARY

The follow summary table highlights the unit count and estimate for each of the development options presented. Refer to appendix A for full Class D estimates for Options 1, 2, and 3.

### SUMMARY CHART

	<b>OPTION 1: TOWN SQUARE</b>	<b>OPTION 2: OUT OF SIGHT</b>	<b>OPTION 3: COMMONS CRESCENT</b>	<b>OPTION 4: PARK</b>
<b>OPEN SPACE %</b>	86% OPEN SPACE 14% HOUSES	91% OPEN SPACE 9% HOUSES	94% OPEN SPACE 6% HOUSES	100% OPEN SPACE 0% HOUSES
<b>UNIT COUNT RANGE</b>	239 - 507 UNITS	163 - 377 UNITS	102 - 294 UNITS	0 UNITS
<b>ACTUAL UNIT COUNT</b>	368 UNITS	256 UNITS	170 UNITS	0 UNITS
<b>CONST. ESTIMATE</b>	\$ 182,296,400	\$ 128,371,300	\$ 89,962,800	N/A
<b>TOTAL \$/UNIT</b>	\$ 495,371/UNIT	\$ 501,450/UNIT	\$ 529,193/UNIT	N/A





# APPENDIX A

CLASS D - ROUGH ORDER OF MAGNITUDE

HANSCOMB QUANTITY SURVEYORS

**CLASS D ESTIMATE - ROUGH ORDER OF  
MAGNITUDE**

**BLOCKHOUSE HILL DEVELOPMENT  
TOWN OF LUNENBURG  
LUNENBURG, NOVA SCOTIA**

**Prepared for:  
Mackay-Lyons Sweetapple Architects Ltd.**

**January 15, 2024**

---

**Hanscomb**  
QUANTITY SURVEYORS

January 15, 2024

Ref # HAL3469



Mackay-Lyons Sweetapple Architects Ltd.  
1715 Lower Water Street, Suite 130  
Halifax, Nova Scotia, B3J 0J4  
T: (902) 429-1867  
E: miranda@mlsarchitects.ca

Attn: Miranda Bailey, March, BEDS, B.Sc.CE, NSAA

Re: Blockhouse Hill Development, Lunenburg, Nova Scotia

Dear Ms. Bailey :

Please find attached our Class D Estimate - Rough Order Of Magnitude for the Blockhouse Hill Development located in Lunenburg, Nova Scotia.

This Class D Estimate - Rough Order Of Magnitude is intended to provide a realistic allocation of direct construction costs and is a determination of fair market value. Pricing shown reflects probable construction costs obtainable in the Lunenburg, Nova Scotia area on the effective date of this report and is not a prediction of low bid. Pricing assumes competitive bidding for every portion of the work.

Hanscomb has prepared this estimate(s) in accordance with generally accepted principles and practices. Our general assumptions are included in Section 3 of this report and any exclusions are identified in Section 1.6. For quality assurance, this estimate has been reviewed by the designated Team Lead as signed below and Hanscomb staff are available and pleased to discuss the contents of this report with any interested party.

Requests for modifications of any apparent errors or omissions to this document must be made to Hanscomb within ten (10) days of receipt of this estimate. Otherwise, it will be understood that the contents have been concurred with and accepted.

We trust our estimate is complete and comprehensive and provides the necessary information to allow for informed capital decisions for moving this project forward. Please do not hesitate to contact us if you have any questions or require additional information.

Yours truly,

**Hanscomb Limited**  
Principal In Charge

A handwritten signature in black ink, appearing to read "Raymond Murray".

Raymond Murray  
PQS, MRICS  
Vice-President

**Hanscomb Limited**  
Principal Estimate Reviewer

A handwritten signature in black ink, appearing to read "Erin Brownlow".

Erin Brownlow  
PQS(F), MRICS, GSC, C.Tech  
Manager / Senior Cost Consultant

**Hanscomb Limited**  
4002 - 7071 Bayers Rd.  
Halifax, NS B3L 2C2  
T: (902) 422-3620  
F: N/A  
halifax@hanscomb.com  
www.hanscomb.com

---

## TABLE OF CONTENTS

1. Introduction		2
1.1 Purpose	2	
1.2 Description	2	
1.3 Methodology	2	
1.4 Specifications	2	
1.5 Estimate Classification and Cost Predictability	3	
1.6 Exclusions	4	
2. Documentation		5
3. Cost Considerations		6
3.1 Cost Base	6	
3.2 Unit Rates	6	
3.3 General Requirements and Fee	6	
3.4 Design and Pricing Allowance	6	
3.5 Escalation Allowance	6	
3.6 Construction Allowance	7	
3.7 Taxes	7	
3.8 Schedule	7	
3.9 Statement of Probable Costs	7	
3.10 Ongoing Cost Control	8	
4. Project Cost Estimate Summary - Option 1 - Town Square		9
Project Cost Estimate Summary - Option 2 - Out of Sight		10
Project Cost Estimate Summary - Option 3 - Common Crescent		11

## Appendices

### Estimates:

A - Option 1 - Town Square	A-1 to A-3
B - Option 2 - Out of Sight	B-1 to B-3
C - Option 3 - Common Crescent	C-1 to C-3
D - Option 4 - Forest (Site Remains as is, therefore no costs associated with this option)	

## **1. INTRODUCTION**

### **1.1 PURPOSE**

This Class D Estimate - Rough Order Of Magnitude is intended to provide a realistic allocation of direct construction costs for the development of Blockhouse Hill located in the Town of Lunenburg into a residential development.

### **1.2 DESCRIPTION**

The Blockhouse Hill Development for residential development is comprised of the following key elements:

*The project includes the development of the Blockhouse Hill area into a residential development and includes cost for the construction of residential streets, sidewalks, curbs, municipal services including water, sanitary & storm drainage, power supply & site lighting. The project also allows for upgrades to the existing pump station, off site wastewater, off site water system. An allowance is included for an Archeological surveyor & monitoring during the development of the site for Option 1, as this was the only option that contains a small undisturbed parcel of land at the top of the hill that was identified as an area with a high potential for historic military resources. An allowance has been included for the construction of the various types of residential structures, but note these are only an allowance as it will be up to the final resident on the style & cost of each dwelling.*

### **1.3 METHODOLOGY**

Hanscomb has prepared this estimate(s) in accordance with generally accepted principles and practices. Hanscomb staff are available to discuss its contents with any interested party.

From the documentation and information provided, quantities of all major elements were assessed or measured where possible and priced at rates considered competitive for a project of this type under a stipulated sum form of contract in January 2024.

Pricing shown reflects probable construction costs obtainable in the Lunenburg, Nova Scotia area on the effective date of this report. This estimate is a determination of fair market value for the construction of this project. It is not a prediction of low bid. Pricing assumes competitive bidding for every portion of the work.

### **1.4 SPECIFICATIONS**

For building components and systems where specifications and design details are not available, quality standards have been established based on discussions with the design team consisting of MacKay-Lyons Sweetapple Architects Ltd. as the lead consultant and with sub-consultants consisting of DesignPoint, Dillion and Davis MacIntyre.

---

**1. INTRODUCTION**

**1.5 ESTIMATE CLASSIFICATION AND COST PREDICTABILITY**

Estimates are defined and classified based on the stage of a project’s development and the level of information available at the time of the milestone estimate.

This Class D Estimate - Rough Order Of Magnitude is considered to have an expected degree of accuracy of +/- 20-30%. In other words, bid results might vary by this amount if the construction budget were set at this milestone estimate.

At the initial stages of a contemplated project, the cost accuracy of the estimate is low as there may be little or no information available to inform a first high-level concept estimate or order of magnitude estimate. As a project nears design completion and is ready to be released to market for tender, the level of accuracy of the estimate is high as the detail is generally extensive and typically represents the information on which contractors will bid.

Milestone cost estimates or “checks” are recommended as the project design develops to keep track of scope and budget. Early detection of potential budget overruns will allow for remedial action before design and scope are locked in. The number of milestone estimates will depend on a project’s size and schedule and cost predictability will improve as the design advances.

According to the Canadian Joint Federal Government/Industry Cost Predictability Taskforce, industry standards for estimate classification and cost estimate accuracy may be summarized as follows:

COST ESTIMATE CLASSIFICATION SYSTEM						
AACE	Class 5	Class 4	Class 3		Class 2	Class 1
DND			Indicative		Substantive	
RAIC	OME	Sketch Design	Design Develop		Contract Documents	Tender Documents
GOC	OME	D	C	← B →		A
<b>Design Documentation % Complete</b>		<b>12.5%</b>	<b>25.0%</b>		<b>95.0%</b>	<b>100.0%</b>
<b>Cost Estimate Accuracy (+/-%)</b>	<b>+/- 30%</b>	<b>+/- 20-30%</b>	<b>+/- 15-20%</b>		<b>+/- 10-15%</b>	<b>+/- 5-10%</b>

This estimate is a Class D level Estimate.

**Legend**

- AACE Association for the Advancement of Cost Engineering
- DND Department of National Defence
- GOC Government of Canada
- RAIC Royal Architectural Institute of Canada
- OME Order of Magnitude Estimate

While the classification categories differ from one authority to the next, the overarching principle for cost predictability remains the same – as the level of detail and design development increases, so does the level of accuracy of the estimate.

## **1. INTRODUCTION**

### **1.6 EXCLUSIONS**

This Class D Estimate - Rough Order Of Magnitude does not provide for the following, if required:

- Cost of contaminated soil removal
- Cost of hazardous material removal
- Escalation contingency, estimated costs are consider to be in current dollars
- Financing fees and premiums
- The costs allowed for the different types of dwelling structures is an allowance based on what an average structure of average size might cost. The final cost and design of the structure will be at the discretion of the resident who purchases the lot, as long as they meet the terms of the Town of Lunenburg on guidelines they may have in place for the development of
- All project Soft Costs have been excluded
- Land purchase has been excluded

## 2. DOCUMENTATION

This Class D Estimate - Rough Order Of Magnitude has been prepared from the documentation provided.

The documentation was received from Mackay-Lyons Sweetapple Architects Ltd. and was supplemented with information gathered in meeting(s) and telephone conversations with the design team lead MacKay-Lyons Sweetapple Architects Ltd. and sub-consultants consisting of DesignPoint, Dillion and Davis MacIntyre.

Design changes and/or additions made subsequent to this issuance of the documentation noted above have not been incorporated in this report.

The following documents have been received and used in the preparation of this report:

Name of Document	Date of Documents	Date Received
Blockhouse Hill Development - Draft ARIA Report	05-Jan-24	06-Jan-24
Blockhouse Hill Development - 4 Design Options	05-Jan-24	06-Jan-24
3D Rendering of Townhouses	05-Jan-24	06-Jan-24
3D Rendering of Duplexs	05-Jan-24	06-Jan-24
3D Rendering of Accessory Dwelling Units	05-Jan-24	06-Jan-24
Blockhouse Hill - Housing Types	06-Jan-24	06-Jan-24
Blockhouse Hill - Sections Through Site	06-Jan-24	06-Jan-24
Blockhouse Hill - Outline of 4 Options	06-Jan-24	06-Jan-24
Blockhouse Hill - Unit Counts for Each Option	06-Jan-24	06-Jan-24
Blockhouse Hill - Preliminary Quantity Estimate for Site Development	10-Jan-24	10-Jan-24

### **3. COST CONSIDERATIONS**

#### **3.1 COST BASE**

All costs are estimated on the basis of competitive bids (a minimum of 4 general contractor bids and at least 4 subcontractor bids for each trade) being received in January 2024 from general contractors and all major subcontractors and suppliers based on a stipulated sum form of contract. If these conditions are not met, bids received could be expected to exceed this estimate.

#### **3.2 UNIT RATES**

The unit rates in the preparation of this Class D Estimate - Rough Order Of Magnitude include labour and material, equipment, subcontractor's overheads and profit. Union contractors are assumed to perform the work.

#### **3.3 GENERAL REQUIREMENTS AND FEE**

General Requirements and Fee cover the General Contractor's indirect costs which may include but not be limited to supervision, site set up, temporary utilities, equipment, utilities, clean up, etc. as covered in Division 1 General Conditions of the Contract Documents. It also includes the contractor's fees and should not be confused with Design or Consultant fees which are excluded from the Construction Costs and carried separately in the Owner's Total Project Costs.

#### **3.4 DESIGN AND PRICING ALLOWANCE**

An allowance of 20% has been included to cover design and pricing unknowns. This allowance is not intended to cover any program space modifications but rather to provide some flexibility for the designers and cost planners during the remaining contract document stages.

It is expected that this allowance amount will be absorbed into the base construction costs as the design advances. The amount by which this allowance is reduced corresponds to an increase in accuracy and detailed design information. Hanscomb recommends that careful consideration be made at each milestone estimate to maintain adequate contingency for this allowance.

As a project nears completion of design, Hanscomb recommends retaining some contingency for this allowance for the final coordination of documents.

#### **3.5 ESCALATION ALLOWANCE**

All costs are based on January 2024 dollars. No escalation allowance has been made for construction cost escalation that may occur between January 2024 and the anticipated bid date for the project. Escalation has been excluded from all costing.

### **3. COST CONSIDERATIONS**

#### **3.6 CONSTRUCTION ALLOWANCE**

An allowance of 10% has been made to cover construction (post contract) unknowns. This allowance, also known as the Post Contract Contingency (PCC), is intended to cover costs for change orders during construction that are not foreseeable. It is not intended to cover scope changes to the contract. The amount carried in a budget for this allowance is typically set at the initial planning stage and should be based on the complexity of the project and the probability of unknowns and retained risks.

#### **3.7 CASH ALLOWANCE**

Cash allowances are intended to allow the contractor to include in the bid price the cost for work that is difficult to fully scope at the time of tendering based on factors that are beyond the Owner and Prime Consultant's control. Cash allowances attempt to reduce the risks by dedicating a set amount for use against a certain cost that cannot yet be detailed. The Contractor is obligated to work as best as possible within the limitations of the Cash Allowance.

Examples of Cash Allowances include inspection and testing, site conditions, upgrades to existing infrastructure, hazardous materials abatement, signage, etc.

Any Cash Allowances if applicable are included either in the details of this estimate under the appropriate discipline or at the summary level.

#### **3.8 TAXES**

No provision has been made for the Harmonized Sales Tax. It is recommended that the owner make separate provision for HST in the project budget.

#### **3.9 SCHEDULE**

Pricing assumes a standard schedule of work appropriate to the size and scope of this project. Premiums for off-hour work, working in an operational facility, accelerated schedule, etc., if applicable, are identified separately in the body of the estimate.

#### **3.10 STATEMENT OF PROBABLE COSTS**

Hanscomb has no control over the cost of labour and materials, the contractor's method of determining prices, or competitive bidding and market conditions. This opinion of probable cost of construction is made on the basis of experience, qualifications and best judgment of the professional consultant familiar with the construction industry. Hanscomb cannot and does not guarantee that proposals, bids or actual construction costs will not vary from this or subsequent cost estimates.

### **3. COST CONSIDERATIONS**

#### **3.11 ONGOING COST CONTROL**

Hanscomb recommends that the Owner and design team carefully review this document, including line item description, unit prices, clarifications, exclusions, inclusions and assumptions, contingencies, escalation, and mark-ups. If the project is over budget, or if there are unresolved budgeting issues, alternative systems/schemes should be evaluated before proceeding into the next design phase.

It is recommended that a final updated estimate at the end of the design stage be produced by Hanscomb using Bid Documents to determine overall cost changes which may have occurred since the preparation of this estimate. The final updated estimate will address changes and additions to the documents, as well as addenda issued during the bidding process. Hanscomb cannot reconcile bid results to any estimate not produced from bid documents including all addenda.

This estimate does not constitute an offer to undertake the work, nor is any guarantee given that an offer, to undertake the work at the estimate(s) price, will subsequently be submitted by a construction contractor. Unless explicitly stated otherwise, it is assumed that competitive bids will be sought when tender documents have been completed. Any significant deviation between bids received and a pre-tender estimate prepared by Hanscomb from the same tender documents, should be evaluated to establish the possible cause(s).

Hanscomb is taking all necessary steps to stay abreast of the potential impacts to the Canadian construction industry that may result from the current pandemic. We are in close contact with consultants, contractors, suppliers and industry to help understand the current and future risks to our local markets including supply chain impacts, delays, labour availability and reduced productivity. As noted herein, this estimate report is based on current market data and potential impacts of the pandemic are not included.

**A - Option 1 - Town Square**

<b>SINGLE DETACHED HOUSING</b>	3 No.	400,000.00	\$1,200,000
<b>SEMI-DETACHED DUPLEXES</b>	162 No.	297,197.53	\$48,146,000
<b>TOWNHOUSES</b>	153 No.	234,470.59	\$35,874,000
<b>ACCESSORY DWELLINGS</b>	50 No.	125,000.00	\$6,250,000
<b>SITE DEVELOPMENT</b>	1 Sum	28,619,700.00	\$28,619,700
<b>NET CONSTRUCTION COSTS</b>	<b>368 No.</b>	<b>326,330.71</b>	<b>\$120,089,700</b>
General Conditions	15%		\$18,013,500
Design & Pricing Allowance	20%		\$27,620,700
Construction Allowance	10%		\$16,572,500
<b>SUB-TOTAL CONSTRUCTION COSTS</b>	<b>368 No</b>	<b>495,370.65</b>	<b>\$182,296,400</b>
HST Excluded	1 Excluded		\$0
Project Ancillaries	1 Excluded		\$0
<b>SUB-TOTAL PROJECT COSTS</b>	<b>368 No</b>	<b>495,370.65</b>	<b>\$182,296,400</b>
Escalation Allowance (Excluded)	1 Excluded		\$0
<b>TOTAL PROJECT CONSTRUCTION COS</b>	<b>368 No</b>	<b>495,370.65</b>	<b>\$182,296,400</b>

**Note:**

Above costs are for total project construction costs and excludes soft costs, land costs, HST and escalation related costs.

**B - Option 2 - Out of Sight**

<b>SINGLE DETACHED HOUSING</b>	3 No.	400,000.00	\$1,200,000
<b>SEMI-DETACHED DUPLEXES</b>	84 No.	297,285.71	\$24,972,000
<b>TOWNHOUSES</b>	143 No.	241,741.26	\$34,569,000
<b>ACCESSORY DWELLINGS</b>	26 No.	125,000.00	\$3,250,000
<b>SITE DEVELOPMENT</b>	1 Sum	20,574,900.00	\$20,574,900

<b>NET CONSTRUCTION COSTS</b>	<b>256 No.</b>	<b>330,335.55</b>	<b>\$84,565,900</b>
General Conditions	15%		\$12,685,000
Design & Pricing Allowance	20%		\$19,450,200
Construction Allowance	10%		\$11,670,200

<b>SUB-TOTAL CONSTRUCTION COSTS</b>	<b>256 No</b>	<b>501,450.39</b>	<b>\$128,371,300</b>
HST Excluded	1 Excluded		\$0
Project Ancillaries	1 Excluded		\$0

<b>SUB-TOTAL PROJECT COSTS</b>	<b>256 No</b>	<b>501,450.39</b>	<b>\$128,371,300</b>
Escalation Allowance (Excluded)	1 Excluded		\$0
<b>TOTAL PROJECT CONSTRUCTION COS</b>	<b>256 No</b>	<b>501,450.39</b>	<b>\$128,371,300</b>

**Note:**

Above costs are for total project construction costs and excludes soft costs, land costs, HST and escalation related costs.

**C - Option 3 - Common Crescent**

<b>SINGLE DETACHED HOUSING</b>	3	No.	400,000.00	\$1,200,000
<b>SEMI-DETACHED DUPLEXES</b>	-	No.		\$0
<b>TOWNHOUSES</b>	164	No.	250,073.17	\$41,012,000
<b>ACCESSORY DWELLINGS</b>	3	No.	125,000.00	\$375,000
<b>SITE DEVELOPMENT</b>	1	Sum	16,676,600.00	\$16,676,600
<b>NET CONSTRUCTION COSTS</b>	<b>170</b>	<b>No.</b>	<b>348,609.41</b>	<b>\$59,263,600</b>
General Conditions	15%			\$8,889,700
Design & Pricing Allowance	20%			\$13,630,900
Construction Allowance	10%			\$8,178,600
<b>SUB-TOTAL CONSTRUCTION COSTS</b>	<b>170</b>	<b>No</b>	<b>529,192.94</b>	<b>\$89,962,800</b>
HST Excluded	1	Excluded		\$0
Project Ancillaries	1	Excluded		\$0
<b>SUB-TOTAL PROJECT COSTS</b>	<b>170</b>	<b>No</b>	<b>529,192.94</b>	<b>\$89,962,800</b>
Escalation Allowance (Excluded)	1	Excluded		\$0
<b>TOTAL PROJECT CONSTRUCTION COS</b>	<b>170</b>	<b>No</b>	<b>529,192.94</b>	<b>\$89,962,800</b>

**Note:**

Above costs are for total project construction costs and excludes soft costs, land costs, HST and escalation related costs.

**Appendix  
A - Option 1 - Town Square**

BLOCKHOUSE HILL DEVELOPMENT	Const. Type	Area of Work	Unit Cost (\$/No.)	Net Const. Cost (\$)	Demolition	General Conditions 15.0%	Design & Pricing Allowance 20.0%	Construction Allowance 10.0%	Total Construction Cost	Net HST (Excluded) 0.00%	Total Construction Cost (w/o HST)	Escalation Allowance (Excluded) 0.0% p.a.	Non-Escalated Total Project Cost	
<b>Option 1 - Town Square</b>														
<b>SINGLE DETACHED HOUSING</b>	<b>New</b>	<b>3 No</b>	<b>400,000.00</b>	<b>\$1,200,000</b>	<b>\$0</b>	<b>\$180,000</b>	<b>\$276,000</b>	<b>\$165,600</b>	<b>\$1,821,600</b>	<b>\$0</b>	<b>\$1,821,600</b>	<b>0.0</b>	<b>\$0</b>	<b>\$1,821,600</b>
- 3 Bedroom homes	New	3 No	400,000.00	\$1,200,000	\$0	\$180,000	\$276,000	\$165,600	\$1,821,600	\$0	\$1,821,600	0.0	\$0	\$1,821,600
- 2 Bedroom homes	New	- No	0.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0	\$0	\$0
- 1 Bedroom homes	New	- No	0.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0	\$0	\$0
<b>SEMI-DETACHED DUPLEXES</b>	<b>New</b>	<b>162 No</b>	<b>297,000.00</b>	<b>\$48,146,000</b>	<b>\$0</b>	<b>\$7,221,900</b>	<b>\$11,073,600</b>	<b>\$6,644,200</b>	<b>\$73,085,700</b>	<b>\$0</b>	<b>\$73,085,700</b>	<b>0.0</b>	<b>\$0</b>	<b>\$73,085,700</b>
- Studio Units	New	- No	0.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0	\$0	\$0
- 1 Bedroom Units	New	- No	0.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0	\$0	\$0
- 2 Bedroom Units	New	116 No	275,000.00	\$31,900,000	\$0	\$4,785,000	\$7,337,000	\$4,402,200	\$48,424,200	\$0	\$48,424,200	0.0	\$0	\$48,424,200
- 3 Bedroom Units	New	46 No	325,000.00	\$14,950,000	\$0	\$2,242,500	\$3,438,500	\$2,063,100	\$22,694,100	\$0	\$22,694,100	0.0	\$0	\$22,694,100
- Sprinkler/fire protection	New	162 No	8,000.00	\$1,296,000	\$0	\$194,400	\$298,100	\$178,900	\$1,967,400	\$0	\$1,967,400	0.0	\$0	\$1,967,400
<b>TOWNHOUSES</b>	<b>New</b>	<b>153 No</b>	<b>234,000.00</b>	<b>\$35,874,000</b>	<b>\$0</b>	<b>\$5,381,100</b>	<b>\$8,251,000</b>	<b>\$4,950,600</b>	<b>\$54,456,700</b>	<b>\$0</b>	<b>\$54,456,700</b>	<b>0.0</b>	<b>\$0</b>	<b>\$54,456,700</b>
- Studio Units	New	- No	0.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0	\$0	\$0
- 1 Bedroom Units	New	93 No	200,000.00	\$18,600,000	\$0	\$2,790,000	\$4,278,000	\$2,566,800	\$28,234,800	\$0	\$28,234,800	0.0	\$0	\$28,234,800
- 2 Bedroom Units	New	18 No	250,000.00	\$4,500,000	\$0	\$675,000	\$1,035,000	\$621,000	\$6,831,000	\$0	\$6,831,000	0.0	\$0	\$6,831,000
- 3 Bedroom Units	New	42 No	275,000.00	\$11,550,000	\$0	\$1,732,500	\$2,656,500	\$1,593,900	\$17,532,900	\$0	\$17,532,900	0.0	\$0	\$17,532,900
- Sprinkler/fire protection	New	153 No	8,000.00	\$1,224,000	\$0	\$183,600	\$281,500	\$168,900	\$1,858,000	\$0	\$1,858,000	0.0	\$0	\$1,858,000
<b>ACCESSORY DWELLINGS</b>	<b>New</b>	<b>50 No</b>	<b>125,000.00</b>	<b>\$6,250,000</b>	<b>\$0</b>	<b>\$937,500</b>	<b>\$1,437,500</b>	<b>\$862,500</b>	<b>\$9,487,500</b>	<b>\$0</b>	<b>\$9,487,500</b>	<b>0.0</b>	<b>\$0</b>	<b>\$9,487,500</b>
- Accessory Dwellings located behind above primary homes	New	50 No.	125,000.00	\$6,250,000	\$0	\$937,500	\$1,437,500	\$862,500	\$9,487,500	\$0	\$9,487,500	0.0	\$0	\$9,487,500
<b>SITE DEVELOPMENT</b>	<b>New</b>	<b>1 Sum</b>	<b>28,620,000.00</b>	<b>\$28,619,700</b>	<b>\$0</b>	<b>\$4,293,000</b>	<b>\$6,582,600</b>	<b>\$3,949,600</b>	<b>\$43,444,900</b>	<b>\$0</b>	<b>\$43,444,900</b>	<b>0.0</b>	<b>\$0</b>	<b>\$43,444,900</b>
Earthworks	New	1 Sum	2,667,500.00	\$2,667,500	\$0	\$400,100	\$613,500	\$368,100	\$4,049,200	\$0	\$4,049,200	0.0	\$0	\$4,049,200
Water System	New	1 Sum	1,014,600.00	\$1,014,600	\$0	\$152,200	\$233,400	\$140,000	\$1,540,200	\$0	\$1,540,200	0.0	\$0	\$1,540,200
Sanitary Sewer System	New	1 Sum	928,800.00	\$928,800	\$0	\$139,300	\$213,600	\$128,200	\$1,409,900	\$0	\$1,409,900	0.0	\$0	\$1,409,900
Storm Sewer System	New	1 Sum	1,460,000.00	\$1,460,000	\$0	\$219,000	\$335,800	\$201,500	\$2,216,300	\$0	\$2,216,300	0.0	\$0	\$2,216,300
Street Construction	New	1 Sum	2,152,500.00	\$2,152,500	\$0	\$322,900	\$495,100	\$297,100	\$3,267,600	\$0	\$3,267,600	0.0	\$0	\$3,267,600
Underground Electrical/Communication	New	1 Sum	923,300.00	\$923,300	\$0	\$138,500	\$212,400	\$127,400	\$1,401,600	\$0	\$1,401,600	0.0	\$0	\$1,401,600
Other	New	1 Sum	8,920,000.00	\$8,920,000	\$0	\$1,338,000	\$2,051,600	\$1,231,000	\$13,540,600	\$0	\$13,540,600	0.0	\$0	\$13,540,600
Water (WTP) & Wastewater Treatment Plant (WWTP) Upgrades	New	1 Sum	10,553,000.00	\$10,553,000	\$0	\$1,583,000	\$2,427,200	\$1,456,300	\$16,019,500	\$0	\$16,019,500	0.0	\$0	\$16,019,500
<b>Total Project Construction Cost - Option 1</b>		<b>368 No</b>	<b>\$326,331</b>	<b>\$120,089,700</b>	<b>\$0</b>	<b>\$18,013,500</b>	<b>\$27,620,700</b>	<b>\$16,572,500</b>	<b>\$182,296,400</b>	<b>\$0</b>	<b>\$182,296,400</b>	<b>-</b>	<b>\$0</b>	<b>\$182,296,400</b>

**Notes:**

- [1] Please note that the above costs are **PRELIMINARY** and are subject to change with design.
- [2] An allowance of 15% on building construction has been included for General Contractor general conditions & fee.
- [3] An allowance of 20% for design & pricing contingency to account for unknowns in design & pricing due to the early stage of the design.
- [4] An allowance of 10% construction contingency has been included for change orders that may occur during construction phase of the project.
- [5] No allowance for escalation has been allowed for, costs are based on current dollars at the date the estimate has been prepared

- [6] HST has been excluded from the above costing
- [7] The above costs exclude items as outlined on page 4 Section 1.6
- [8] Costing assumes competitive bidding by general contractors and sub-trades
- [9] Soft costs, financing costs and land cost are excluded, the above cost are for project hard costs only
- [10] Cost of contaminated soil removal

**SITE DEVELOPMENT**

**A - Option 1 - Town Square**

	Quantity		Unit rate	Amount
<b>1.00 Earthworks</b>			<b>Sum</b>	<b>\$2,667,500</b>
1.01 Clearing	9	Ha	7,500.00	\$67,500
1.02 Grubbing (to a depth of 300 mm)	9	Ha	50,000.00	\$450,000
1.03 Mass Excavation - Common	40,000	m3	25.00	\$1,000,000
1.04 Mass Excavation - Rock	20,000	m3	55.00	\$1,100,000
1.05 Environmental Measures	1	ls	50,000.00	\$50,000
<b>2.00 Water System</b>			<b>Sum</b>	<b>\$1,014,600</b>
2.01 250mm CI CL52	1,623	m	375.00	\$608,600
2.02 250m Gate Valve	19	each	2,500.00	\$47,500
2.03 Water Lateral	584	m	250.00	\$146,000
2.04 Lateral Fittings	73	each	500.00	\$36,500
2.05 Hydrant	12	m	8,000.00	\$96,000
2.06 Air Release Valve	1	each	5,000.00	\$5,000
2.07 Conneciton to Existing	5	each	15,000.00	\$75,000
<b>3.00 Sanitary Sewer System</b>			<b>Sum</b>	<b>\$928,800</b>
3.01 250mm PVC DR35	1,480	m	410.00	\$606,800
3.02 1050mm Precase Manhole	23	each	7,000.00	\$161,000
3.03 Wastewater Lateral	584	m	250.00	\$146,000
3.04 Connection to existing	1	each	15,000.00	\$15,000
<b>4.00 Storm Sewer System</b>			<b>Sum</b>	<b>\$1,460,000</b>
4.01 300mm PVC DR35	500	m	415.00	\$207,500
4.02 375mm PVC DR35	500	m	465.00	\$232,500
4.03 450mm CSA A257.2	200	m	525.00	\$105,000
4.04 525mm CSA A257.2	100	m	600.00	\$60,000
4.05 600mm CSA A257.2	100	m	700.00	\$70,000
4.06 750mm CSA A257.2	100	m	825.00	\$82,500
4.07 900mm CSA A257.2 with reinstatement	50	m	1,050.00	\$52,500
4.08 1050mm Precast Manhole	12	each	7,000.00	\$84,000
4.09 1200mm Precast Manhole	3	each	9,500.00	\$28,500
4.10 1500mm Precast Manhole	2	each	12,000.00	\$24,000
4.11 Stormwater Lateral	584	m	250.00	\$146,000
4.12 1050mm Catchbasin (single)	34	each	7,000.00	\$238,000
4.13 1050mm Catchbasin (double)	2	each	10,000.00	\$20,000
4.14 Precase Headwall with Grade (900)	1	each	1,500.00	\$1,500
4.15 Drainage Ditch	200	m	225.00	\$45,000
4.16 Rocklining (100mm-200mm)	300	m2	210.00	\$63,000

<b>SITE DEVELOPMENT</b>	<b>Quantity</b>	<b>Unit rate</b>	<b>Amount</b>
<b>A - Option 1 - Town Square</b>			
<b>5.00 Street Construction</b>		<b>Sum</b>	<b>\$2,152,500</b>
5.01 Type 1 Gravel	2,714 m3	65.00	\$176,400
5.02 Type 2 Gravel	5,427 m3	65.00	\$352,800
5.03 Asphalt Concrete	1,628 m3	215.00	\$350,000
5.04 100mm Concrete Sidewalk	3,429 m2	120.00	\$411,500
5.05 150mm Concrete Driveway Sidewalk	329 m2	150.00	\$49,300
5.06 Concrete Curb	3,350 m	100.00	\$335,000
5.07 100mm Topsoil & Sod (allowance only)	1,000 m2	25.00	\$25,000
5.08 Street Signs inc bases	10 each	350.00	\$3,500
5.09 Backyard Retaining Wall Allowance (w/ rail/fence)	1,750 m2	250.00	\$437,500
5.10 1.2 High Chain Link Fence (allowance only)	100 m	115.00	\$11,500
<b>6.00 Underground Electrical/Communication</b>		<b>Sum</b>	<b>\$923,300</b>
6.01 Underground Power and Communication Allowance	1,675 m	150.00	\$251,300
6.02 Decorative Street Light Allowance c/w conduit/wiring/contrc	56 each	12,000.00	\$672,000
<b>7.00 Other</b>		<b>Sum</b>	<b>\$8,920,000</b>
7.01 Walkway/Rtrail/Retaining Wall Allowance	1 sum	750,000.00	\$750,000
7.02 Stair Allowance	1 sum	350,000.00	\$350,000
7.03 Power Line Removal Allowance (at ex park)	1 sum	20,000.00	\$20,000
7.04 Existing Pump Station Upgrade Allowance	1 sum	1,500,000.00	\$1,500,000
7.05 Existing CB Removal at Pump Station	1 sum	100,000.00	\$100,000
7.06 Off Site Wastewater Upgrade Allowance	1 sum	2,000,000.00	\$2,000,000
7.07 Off Site Water System Upgrade Allowance	1 sum	4,000,000.00	\$4,000,000
7.08 Archeological Allowance	1 sum	100,000.00	\$100,000
7.09 Landscaping Allowance	1 sum	100,000.00	\$100,000
<b>8.00 Water (WTP) &amp; Wastewater Treatment Plant (WWTP) Upgrades</b>		<b>Sum</b>	<b>\$10,553,000</b>
8.01 WTP Upgrades - to accommodate growth for BHH	1 sum	4,690,000.00	\$4,690,000
8.02 WWTP Upgrades - to accommodate growth for BHH	1 sum	5,863,000.00	\$5,863,000
<b>Total:</b>			<b>\$28,619,700</b>

**CLASS D ESTIMATE - ROUGH ORDER OF MAGNITUDE**

**Appendix  
B - Option 2 - Out of Sight**

BLOCKHOUSE HILL DEVELOPMENT	Const. Type	Area of Work	Unit Cost (\$/No.)	Net Const. Cost (\$)	Demolition	General Conditions 15.0%	Design & Pricing Allowance 20.0%	Construction Allowance 10.0%	Total Construction Cost	Net HST (Excluded) 0.00%	Total Construction Cost (w/o HST)	Escalation Allowance (Excluded) 0.0% p.a.	Non-Escalated Total Project Cost	
<b>Option 2 - Out of Sight</b>														
<b>SINGLE DETACHED HOUSING</b>	New	<b>3 No</b>	<b>400,000.00</b>	<b>\$1,200,000</b>	<b>\$0</b>	<b>\$180,000</b>	<b>\$276,000</b>	<b>\$165,600</b>	<b>\$1,821,600</b>	<b>\$0</b>	<b>\$1,821,600</b>	<b>0.0</b>	<b>\$0</b>	<b>\$1,821,600</b>
- 3 Bedroom homes	New	3 No	400,000.00	\$1,200,000	\$0	\$180,000	\$276,000	\$165,600	\$1,821,600	\$0	\$1,821,600	0.0	\$0	\$1,821,600
- 2 Bedroom homes	New	- No	0.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0	\$0	\$0
- 1 Bedroom homes	New	- No	0.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0	\$0	\$0
<b>SEMI-DETACHED DUPLEXES</b>	New	<b>84 No</b>	<b>297,000.00</b>	<b>\$24,972,000</b>	<b>\$0</b>	<b>\$3,745,800</b>	<b>\$5,743,600</b>	<b>\$3,446,100</b>	<b>\$37,907,500</b>	<b>\$0</b>	<b>\$37,907,500</b>	<b>0.0</b>	<b>\$0</b>	<b>\$37,907,500</b>
- Studio Units	New	- No	0.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0	\$0	\$0
- 1 Bedroom Units	New	- No	0.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0	\$0	\$0
- 2 Bedroom Units	New	60 No	275,000.00	\$16,500,000	\$0	\$2,475,000	\$3,795,000	\$2,277,000	\$25,047,000	\$0	\$25,047,000	0.0	\$0	\$25,047,000
- 3 Bedroom Units	New	24 No	325,000.00	\$7,800,000	\$0	\$1,170,000	\$1,794,000	\$1,076,400	\$11,840,400	\$0	\$11,840,400	0.0	\$0	\$11,840,400
- Sprinkler/fire protection	New	84 No	8,000.00	\$672,000	\$0	\$100,800	\$154,600	\$92,700	\$1,020,100	\$0	\$1,020,100	0.0	\$0	\$1,020,100
<b>TOWNHOUSES</b>	New	<b>143 No</b>	<b>242,000.00</b>	<b>\$34,569,000</b>	<b>\$0</b>	<b>\$5,185,400</b>	<b>\$7,950,900</b>	<b>\$4,770,600</b>	<b>\$52,475,900</b>	<b>\$0</b>	<b>\$52,475,900</b>	<b>0.0</b>	<b>\$0</b>	<b>\$52,475,900</b>
- Studio Units	New	- No	0.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0	\$0	\$0
- 1 Bedroom Units	New	66 No	200,000.00	\$13,200,000	\$0	\$1,980,000	\$3,036,000	\$1,821,600	\$20,037,600	\$0	\$20,037,600	0.0	\$0	\$20,037,600
- 2 Bedroom Units	New	38 No	250,000.00	\$9,500,000	\$0	\$1,425,000	\$2,185,000	\$1,311,000	\$14,421,000	\$0	\$14,421,000	0.0	\$0	\$14,421,000
- 3 Bedroom Units	New	39 No	275,000.00	\$10,725,000	\$0	\$1,608,800	\$2,466,800	\$1,480,100	\$16,280,700	\$0	\$16,280,700	0.0	\$0	\$16,280,700
- Sprinkler/fire protection	New	143 No	8,000.00	\$1,144,000	\$0	\$171,600	\$263,100	\$157,900	\$1,736,600	\$0	\$1,736,600	0.0	\$0	\$1,736,600
<b>ACCESSORY DWELLINGS</b>	New	<b>26 No</b>	<b>125,000.00</b>	<b>\$3,250,000</b>	<b>\$0</b>	<b>\$487,500</b>	<b>\$747,500</b>	<b>\$448,500</b>	<b>\$4,933,500</b>	<b>\$0</b>	<b>\$4,933,500</b>	<b>0.0</b>	<b>\$0</b>	<b>\$4,933,500</b>
- Accessory Dwellings located behind above primary homes	New	26 No.	125,000.00	\$3,250,000	\$0	\$487,500	\$747,500	\$448,500	\$4,933,500	\$0	\$4,933,500	0.0	\$0	\$4,933,500
<b>SITE DEVELOPMENT</b>	New	<b>1 Sum</b>	<b>20,575,000.00</b>	<b>\$20,574,900</b>	<b>\$0</b>	<b>\$3,086,300</b>	<b>\$4,732,200</b>	<b>\$2,839,400</b>	<b>\$31,232,800</b>	<b>\$0</b>	<b>\$31,232,800</b>	<b>0.0</b>	<b>\$0</b>	<b>\$31,232,800</b>
Earthworks	New	1 Sum	1,502,500.00	\$1,502,500	\$0	\$225,400	\$345,600	\$207,400	\$2,280,900	\$0	\$2,280,900	0.0	\$0	\$2,280,900
Water System	New	1 Sum	802,000.00	\$802,000	\$0	\$120,300	\$184,500	\$110,700	\$1,217,500	\$0	\$1,217,500	0.0	\$0	\$1,217,500
Sanitary Sewer System	New	1 Sum	692,200.00	\$692,200	\$0	\$103,800	\$159,200	\$95,500	\$1,050,700	\$0	\$1,050,700	0.0	\$0	\$1,050,700
Storm Sewer System	New	1 Sum	1,079,200.00	\$1,079,200	\$0	\$161,900	\$248,200	\$148,900	\$1,638,200	\$0	\$1,638,200	0.0	\$0	\$1,638,200
Street Construction	New	1 Sum	1,604,500.00	\$1,604,500	\$0	\$240,700	\$369,000	\$221,400	\$2,435,600	\$0	\$2,435,600	0.0	\$0	\$2,435,600
Underground Electrical/Communication	New	1 Sum	661,500.00	\$661,500	\$0	\$99,200	\$152,100	\$91,300	\$1,004,100	\$0	\$1,004,100	0.0	\$0	\$1,004,100
Other	New	1 Sum	8,900,000.00	\$8,900,000	\$0	\$1,335,000	\$2,047,000	\$1,228,200	\$13,510,200	\$0	\$13,510,200	0.0	\$0	\$13,510,200
Water (WTP) & Wastewater Treatment Plant (WWTP) Upgrades	New	1 Sum	5,333,000.00	\$5,333,000	\$0	\$800,000	\$1,226,600	\$736,000	\$8,095,600	\$0	\$8,095,600	0.0	\$0	\$8,095,600
<b>Total Project Construction Cost - Option 1</b>		<b>256 No</b>	<b>\$330,336</b>	<b>\$84,565,900</b>	<b>\$0</b>	<b>\$12,685,000</b>	<b>\$19,450,200</b>	<b>\$11,670,200</b>	<b>\$128,371,300</b>	<b>\$0</b>	<b>\$128,371,300</b>	<b>-</b>	<b>\$0</b>	<b>\$128,371,300</b>

**Notes:**

- [1] Please note that the above costs are **PRELIMINARY** and are subject to change with design.
- [2] An allowance of 15% on building construction has been included for General Contractor general conditions & fee.
- [3] An allowance of 20% for design & pricing contingency to account for unknowns in design & pricing due to the early stage of the design.
- [4] An allowance of 10% construction contingency has been included for change orders that may occur during construction phase of the project.
- [5] No allowance for escalation has been allowed for, costs are based on current dollars at the date the estimate has been prepared

- [6] HST has been excluded from the above costing
- [7] The above costs exclude items as outlined on page 4 Section 1.6
- [8] Costing assumes competitive bidding by general contractors and sub-trades
- [9] Soft costs, financing costs and land cost are excluded, the above cost are for project hard costs only
- [10] Cost of contaminated soil removal

**SITE DEVELOPMENT**

**B - Option 2 - Out of Sight**

	Quantity		Unit rate	Amount
<b>1.00 Earthworks</b>			<b>Sum</b>	<b>\$1,502,500</b>
1.01 Clearing	7	Ha	7,500.00	\$52,500
1.02 Grubbing (to a depth of 300 mm)	7	Ha	50,000.00	\$350,000
1.03 Mass Excavation - Common	20,000	m3	25.00	\$500,000
1.04 Mass Excavation - Rock	10,000	m3	55.00	\$550,000
1.05 Environmental Measures	1	ls	50,000.00	\$50,000
<b>2.00 Water System</b>			<b>Sum</b>	<b>\$802,000</b>
2.01 250mm CI CL52	1,100	m	375.00	\$412,500
2.02 250m Gate Valve	19	each	2,500.00	\$47,500
2.03 Water Lateral	392	m	250.00	\$98,000
2.04 Lateral Fittings	49	each	500.00	\$24,500
2.05 Hydrant	12	m	8,000.00	\$96,000
2.06 Air Release Valve	1	each	5,000.00	\$5,000
2.07 Conneciton to Existing	4	each	15,000.00	\$60,000
2.08 Sawpit Road Watermain	130	m	450.00	\$58,500
<b>3.00 Sanitary Sewer System</b>			<b>Sum</b>	<b>\$692,200</b>
3.01 250mm PVC DR35	1,020	m	410.00	\$418,200
3.02 1050mm Precase Manhole	23	each	7,000.00	\$161,000
3.03 Wastewater Lateral	392	m	250.00	\$98,000
3.04 Connection to existing	1	each	15,000.00	\$15,000
<b>4.00 Storm Sewer System</b>			<b>Sum</b>	<b>\$1,079,200</b>
4.01 300mm PVC DR35	450	m	415.00	\$186,800
4.02 375mm PVC DR35	250	m	465.00	\$116,300
4.03 450mm CSA A257.2	200	m	525.00	\$105,000
4.04 525mm CSA A257.2	100	m	600.00	\$60,000
4.05 600mm CSA A257.2	100	m	700.00	\$70,000
4.06 750mm CSA A257.2 with reinstatement	50	m	825.00	\$41,300
4.07 900mm CSA A257.2 with reinstatement	0	m	1,050.00	\$0
4.08 1050mm Precast Manhole	12	each	7,000.00	\$84,000
4.09 1200mm Precast Manhole	3	each	9,500.00	\$28,500
4.10 1500mm Precast Manhole	2	each	12,000.00	\$24,000
4.11 Stormwater Lateral	392	m	250.00	\$98,000
4.12 1050mm Catchbasin (single)	24	each	7,000.00	\$168,000
4.13 1050mm Catchbasin (double)	2	each	10,000.00	\$20,000
4.14 Precase Headwall with Grade (900)	1	each	1,500.00	\$1,500
4.15 Drainage Ditch	150	m	225.00	\$33,800
4.16 Rocklining (100mm-200mm)	200	m2	210.00	\$42,000

<b>SITE DEVELOPMENT</b>	<b>Quantity</b>	<b>Unit rate</b>	<b>Amount</b>
<b>B - Option 2 - Out of Sight</b>			
<b>5.00 Street Construction</b>		<b>Sum</b>	<b>\$1,604,500</b>
5.01 Type 1 Gravel	1,960 m3	65.00	\$127,400
5.02 Type 2 Gravel	3,920 m3	65.00	\$254,800
5.03 Asphalt Concrete	1,176 m3	215.00	\$252,800
5.04 100mm Concrete Sidewalk	2,900 m2	120.00	\$348,000
5.05 150mm Concrete Driveway Sidewalk	221 m2	150.00	\$33,200
5.06 Concrete Curb	2,420 m	100.00	\$242,000
5.07 100mm Topsoil & Sod (allowance only)	1,000 m2	25.00	\$25,000
5.08 Street Signs inc bases	10 each	350.00	\$3,500
5.09 Backyard Retaining Wall Allowance (w/ rail/fence)	825 m2	250.00	\$206,300
5.10 Various grading and drainage upgrades	1 each	100,000.00	\$100,000
5.11 1.2 High Chain Link Fence (allowance only)	100 m	115.00	\$11,500
<b>6.00 Underground Electrical/Communication</b>		<b>Sum</b>	<b>\$661,500</b>
6.01 Underground Power and Communication Allowance	1,210 m	150.00	\$181,500
6.02 Decorative Street Light Allowance c/w conduit/wiring/contrc	40 each	12,000.00	\$480,000
<b>7.00 Other</b>		<b>Sum</b>	<b>\$8,900,000</b>
7.01 Power Pole Relocation Allowance	1 each	500,000.00	\$500,000
7.02 Walkway/Rtrail/Retaining Wall Allowance	1 sum	550,000.00	\$550,000
7.03 Stair Allowance	1 sum	150,000.00	\$150,000
7.04 Existing Pump Station Upgrade Allowance	1 sum	1,500,000.00	\$1,500,000
7.05 Existing CB Removal at Pump Station	1 sum	100,000.00	\$100,000
7.06 Off Site Wastewater Upgrade Allowance	1 sum	2,000,000.00	\$2,000,000
7.07 Off Site Water System Upgrade Allowance	1 sum	4,000,000.00	\$4,000,000
7.08 Landscaping Allowance	1 sum	100,000.00	\$100,000
<b>8.00 Water (WTP) &amp; Wastewater Treatment Plant (WWTP) Upgrades</b>		<b>Sum</b>	<b>\$5,333,000</b>
8.01 WTP Upgrades - to accommodate growth for BHH	1 sum	2,370,000.00	\$2,370,000
8.02 WWTP Upgrades - to accommodate growth for BHH	1 sum	2,963,000.00	\$2,963,000
	<b>Total:</b>		<b>\$20,574,900</b>

**CLASS D ESTIMATE - ROUGH ORDER OF MAGNITUDE**

**Appendix  
C - Option 3 - Common Crescent**

BLOCKHOUSE HILL DEVELOPMENT	Const. Type	Area of Work	Unit Cost (\$/No.)	Net Const. Cost (\$)	Demolition	General Conditions 15.0%	Design & Pricing Allowance 20.0%	Construction Allowance 10.0%	Total Construction Cost	Net HST (Excluded) 0.00%	Total Construction Cost (w/o HST)	Escalation Allowance (Excluded) 0.0% p.a. Yrs	Non-Escalated Total Project Cost	
<b>Option 3 - Common Crescent</b>														
<b>SINGLE DETACHED HOUSING</b>	<b>New</b>	<b>3 No</b>	<b>400,000.00</b>	<b>\$1,200,000</b>	<b>\$0</b>	<b>\$180,000</b>	<b>\$276,000</b>	<b>\$165,600</b>	<b>\$1,821,600</b>	<b>\$0</b>	<b>\$1,821,600</b>	<b>0.0</b>	<b>\$0</b>	<b>\$1,821,600</b>
- 3 Bedroom homes	New	3 No	400,000.00	\$1,200,000	\$0	\$180,000	\$276,000	\$165,600	\$1,821,600	\$0	\$1,821,600	0.0	\$0	\$1,821,600
- 2 Bedroom homes	New	- No	0.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0	\$0	\$0
- 1 Bedroom homes	New	- No	0.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0	\$0	\$0
<b>SEMI-DETACHED DUPLEXES</b>	<b>New</b>	<b>- No</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>0.0</b>	<b>\$0</b>	<b>\$0</b>
- Studio Units	New	- No	0.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0	\$0	\$0
- 1 Bedroom Units	New	- No	0.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0	\$0	\$0
- 2 Bedroom Units	New	- No	275,000.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0	\$0	\$0
- 3 Bedroom Units	New	- No	325,000.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0	\$0	\$0
- Sprinkler/fire protection	New	- No	8,000.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0	\$0	\$0
<b>TOWNHOUSES</b>	<b>New</b>	<b>164 No</b>	<b>250,000.00</b>	<b>\$41,012,000</b>	<b>\$0</b>	<b>\$6,151,800</b>	<b>\$9,432,800</b>	<b>\$5,659,700</b>	<b>\$62,256,300</b>	<b>\$0</b>	<b>\$62,256,300</b>	<b>0.0</b>	<b>\$0</b>	<b>\$62,256,300</b>
- Studio Units	New	- No	0.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.0	\$0	\$0
- 1 Bedroom Units	New	48 No	200,000.00	\$9,600,000	\$0	\$1,440,000	\$2,208,000	\$1,324,800	\$14,572,800	\$0	\$14,572,800	0.0	\$0	\$14,572,800
- 2 Bedroom Units	New	72 No	250,000.00	\$18,000,000	\$0	\$2,700,000	\$4,140,000	\$2,484,000	\$27,324,000	\$0	\$27,324,000	0.0	\$0	\$27,324,000
- 3 Bedroom Units	New	44 No	275,000.00	\$12,100,000	\$0	\$1,815,000	\$2,783,000	\$1,669,800	\$18,367,800	\$0	\$18,367,800	0.0	\$0	\$18,367,800
- Sprinkler/fire protection	New	164 No	8,000.00	\$1,312,000	\$0	\$196,800	\$301,800	\$181,100	\$1,991,700	\$0	\$1,991,700	0.0	\$0	\$1,991,700
<b>ACCESSORY DWELLINGS</b>	<b>New</b>	<b>3 No</b>	<b>125,000.00</b>	<b>\$375,000</b>	<b>\$0</b>	<b>\$56,300</b>	<b>\$86,300</b>	<b>\$51,800</b>	<b>\$569,400</b>	<b>\$0</b>	<b>\$569,400</b>	<b>0.0</b>	<b>\$0</b>	<b>\$569,400</b>
- Accessory Dwellings located behind above primary homes	New	3 No.	125,000.00	\$375,000	\$0	\$56,300	\$86,300	\$51,800	\$569,400	\$0	\$569,400	0.0	\$0	\$569,400
<b>SITE DEVELOPMENT</b>	<b>New</b>	<b>1 Sum</b>	<b>16,677,000.00</b>	<b>\$16,676,600</b>	<b>\$0</b>	<b>\$2,501,600</b>	<b>\$3,835,800</b>	<b>\$2,301,500</b>	<b>\$25,315,500</b>	<b>\$0</b>	<b>\$25,315,500</b>	<b>0.0</b>	<b>\$0</b>	<b>\$25,315,500</b>
Earthworks	New	1 Sum	612,500.00	\$612,500	\$0	\$91,900	\$140,900	\$84,500	\$929,800	\$0	\$929,800	0.0	\$0	\$929,800
Water System	New	1 Sum	471,100.00	\$471,100	\$0	\$70,700	\$108,400	\$65,000	\$715,200	\$0	\$715,200	0.0	\$0	\$715,200
Sanitary Sewer System	New	1 Sum	302,500.00	\$302,500	\$0	\$45,400	\$69,600	\$41,800	\$459,300	\$0	\$459,300	0.0	\$0	\$459,300
Storm Sewer System	New	1 Sum	563,600.00	\$563,600	\$0	\$84,500	\$129,600	\$77,800	\$855,500	\$0	\$855,500	0.0	\$0	\$855,500
Street Construction	New	1 Sum	756,900.00	\$756,900	\$0	\$113,500	\$174,100	\$104,500	\$1,149,000	\$0	\$1,149,000	0.0	\$0	\$1,149,000
Underground Electrical/Communication	New	1 Sum	345,000.00	\$345,000	\$0	\$51,800	\$79,400	\$47,600	\$523,800	\$0	\$523,800	0.0	\$0	\$523,800
Other	New	1 Sum	8,450,000.00	\$8,450,000	\$0	\$1,267,500	\$1,943,500	\$1,166,100	\$12,827,100	\$0	\$12,827,100	0.0	\$0	\$12,827,100
Water (WTP) & Wastewater Treatment Plant (WWTP) Upgrades	New	1 Sum	5,175,000.00	\$5,175,000	\$0	\$776,300	\$1,190,300	\$714,200	\$7,855,800	\$0	\$7,855,800	0.0	\$0	\$7,855,800
<b>Total Project Construction Cost - Option 1</b>		<b>170 No</b>	<b>\$348,609</b>	<b>\$59,263,600</b>	<b>\$0</b>	<b>\$8,889,700</b>	<b>\$13,630,900</b>	<b>\$8,178,600</b>	<b>\$89,962,800</b>	<b>\$0</b>	<b>\$89,962,800</b>	<b>-</b>	<b>\$0</b>	<b>\$89,962,800</b>

**Notes:**

- [1] Please note that the above costs are **PRELIMINARY** and are subject to change with design.
- [2] An allowance of 15% on building construction has been included for General Contractor general conditions & fee.
- [3] An allowance of 20% for design & pricing contingency to account for unknowns in design & pricing due to the early stage of the design.
- [4] An allowance of 10% construction contingency has been included for change orders that may occur during construction phase of the project.
- [5] No allowance for escalation has been allowed for, costs are based on current dollars at the date the estimate has been prepared

- [6] HST has been excluded from the above costing
- [7] The above costs exclude items as outlined on page 4 Section 1.6
- [8] Costing assumes competitive bidding by general contractors and sub-trades
- [9] Soft costs, financing costs and land cost are excluded, the above cost are for project hard costs only
- [10] Cost of contaminated soil removal

**SITE DEVELOPMENT**

**C - Option 3 - Common Crescent**

	Quantity		Unit rate	Amount
<b>1.00 Earthworks</b>			<b>Sum</b>	<b>\$612,500</b>
1.01 Clearing	3	Ha	7,500.00	\$22,500
1.02 Grubbing (to a depth of 300 mm)	3	Ha	50,000.00	\$150,000
1.03 Mass Excavation - Common	10,000	m3	25.00	\$250,000
1.04 Mass Excavation - Rock	3,000	m3	55.00	\$165,000
1.05 Environmental Measures	1	ls	25,000.00	\$25,000
<b>2.00 Water System</b>			<b>Sum</b>	<b>\$471,100</b>
2.01 250mm CI CL52	635	m	375.00	\$238,100
2.02 250m Gate Valve	4	each	2,500.00	\$10,000
2.03 Water Lateral	216	m	250.00	\$54,000
2.04 Lateral Fittings	27	each	500.00	\$13,500
2.05 Hydrant	4	m	8,000.00	\$32,000
2.06 Air Release Valve	1	each	5,000.00	\$5,000
2.07 Conneciton to Existing	4	each	15,000.00	\$60,000
2.08 Sawpit Road Watermain	130	m	450.00	\$58,500
<b>3.00 Sanitary Sewer System</b>			<b>Sum</b>	<b>\$302,500</b>
3.01 250mm PVC DR35	450	m	410.00	\$184,500
3.02 1050mm Precase Manhole	7	each	7,000.00	\$49,000
3.03 Wastewater Lateral	216	m	250.00	\$54,000
3.04 Connection to existing	1	each	15,000.00	\$15,000
<b>4.00 Storm Sewer System</b>			<b>Sum</b>	<b>\$563,600</b>
4.01 300mm PVC DR35	200	m	415.00	\$83,000
4.02 375mm PVC DR35	150	m	465.00	\$69,800
4.03 450mm CSA A257.2	100	m	525.00	\$52,500
4.04 525mm CSA A257.2	100	m	600.00	\$60,000
4.05 600mm CSA A257.2	0	m	700.00	\$0
4.06 750mm CSA A257.2	50	m	825.00	\$41,300
4.07 900mm CSA A257.2 with reinstatement	0	m	1,050.00	\$0
4.08 1050mm Precast Manhole	5	each	7,000.00	\$35,000
4.09 1200mm Precast Manhole	2	each	9,500.00	\$19,000
4.10 Stormwater Lateral	216	m	250.00	\$54,000
4.11 1050mm Catchbasin (single)	12	each	7,000.00	\$84,000
4.12 1050mm Catchbasin (double)	2	each	10,000.00	\$20,000
4.13 Precase Headwall with Grade (900)	1	each	1,500.00	\$1,500
4.14 Drainage Ditch	100	m	225.00	\$22,500
4.15 Rocklining (100mm-200mm)	100	m2	210.00	\$21,000

**SITE DEVELOPMENT**

Quantity

Unit rate

Amount

**C - Option 3 - Common Crescent**

**5.00 Street Construction**

**Sum**

**\$756,900**

5.01 Type 1 Gravel	1,040	m3	65.00	\$67,600
5.02 Type 2 Gravel	2,009	m3	65.00	\$130,600
5.03 Asphalt Concrete	603	m3	215.00	\$129,600
5.04 100mm Concrete Sidewalk	1,119	m2	120.00	\$134,300
5.05 150mm Concrete Driveway Sidewalk	122	m2	150.00	\$18,300
5.06 Concrete Curb	1,240	m	100.00	\$124,000
5.07 100mm Topsoil & Sod (allowance only)	1,000	m2	25.00	\$25,000
5.08 Street Signs inc bases	10	each	350.00	\$3,500
5.09 Backyard Retaining Wall Allowance (w/ rail/fence)	250	m2	250.00	\$62,500
5.10 Various grading and drainage upgrades	1	each	50,000.00	\$50,000
5.11 1.2 High Chain Link Fence (allowance only)	100	m	115.00	\$11,500

**6.00 Underground Electrical/Communication**

**Sum**

**\$345,000**

6.01 Underground Power and Communication Allowance	620	m	150.00	\$93,000
6.02 Decorative Street Light Allowance c/w conduit/wiring/contrc	21	each	12,000.00	\$252,000

**7.00 Other**

**Sum**

**\$8,450,000**

7.01 Power Pole Relocation Allowance	1	each	500,000.00	\$500,000
7.02 Walkway/Rtrail/Retaining Wall Allowance	1	sum	250,000.00	\$250,000
7.03 Existing Pump Station Upgrade Allowance	1	sum	1,500,000.00	\$1,500,000
7.04 Existing CB Removal at Pump Station	1	sum	100,000.00	\$100,000
7.05 Off Site Wastewater Upgrade Allowance	1	sum	2,000,000.00	\$2,000,000
7.06 Off Site Water System Upgrade Allowance	1	sum	4,000,000.00	\$4,000,000
7.07 Landscaping Allowance	1	sum	100,000.00	\$100,000

**8.00 Water (WTP) & Wastewater Treatment Plant (WWTP) Upgrades**

**Sum**

**\$5,175,000**

8.01 WTP Upgrades - to accommodate growth for BHH	1	sum	2,300,000.00	\$2,300,000
8.02 WWTP Upgrades - to accommodate growth for BHH	1	sum	2,875,000.00	\$2,875,000

**Total:**

**\$16,676,600**

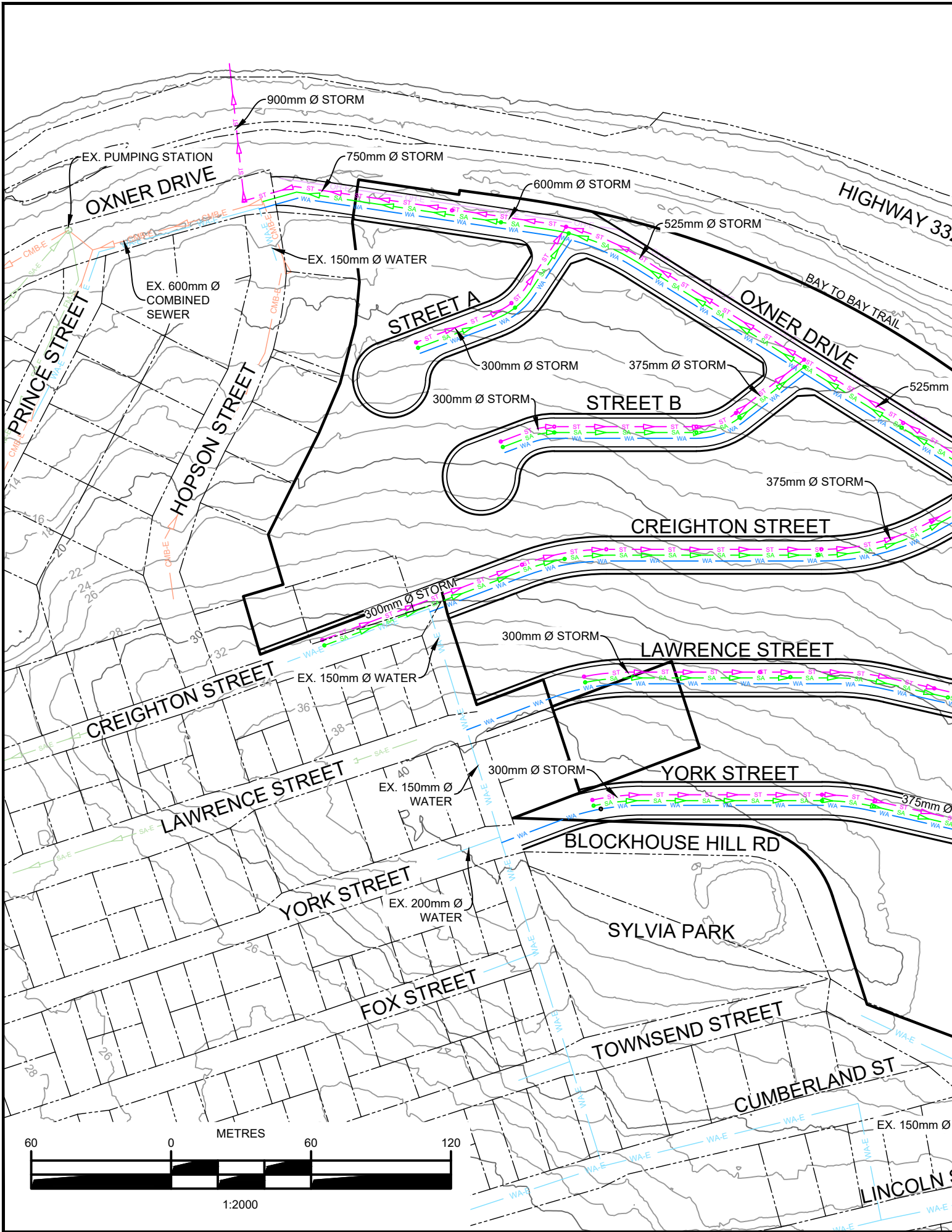
**CLASS D ESTIMATE - ROUGH ORDER OF MAGNITUDE**

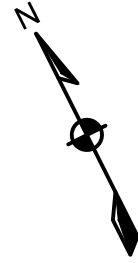


# APPENDIX B

B.1 SERVICING SCHEMATICS  
B.2 SERVICING REVIEW LETTER

DESIGNPOINT





# BACK HARBOUR

2 (BYPASS RD)

Ø STORM

EXISTING POWER EASEMENT

450mm Ø STORM

mm STORM

HARBOUR VIEW HAVEN

SAWPIT ROAD

WATER

STREET

EX. 150mm Ø WATER

### NOTES

1. CONTOURS SHOWN AT 2m INTERVAL, BASED ON PROVINCIAL LIDAR DATA.
2. THIS PLAN IS PRELIMINARY ONLY AND IS SUBJECT TO APPROVAL AND DETAILED DESIGN.
3. MINIMUM GRAVITY SANITARY MAIN TO 250mm
4. MINIMUM WATER MAIN TO BE 250mm.
5. MINIMUM STORM MAIN TO BE 300mm.
6. PIPES SIZING IS APPROXIMATE AND SUBJECT TO DETAILED DESIGN AND MODELING + APPROVALS

### CLIENT

MACKAY-LYONS  
SWEETAPPLE  
ARCHTECTS LIMITED

### CONSULTANT

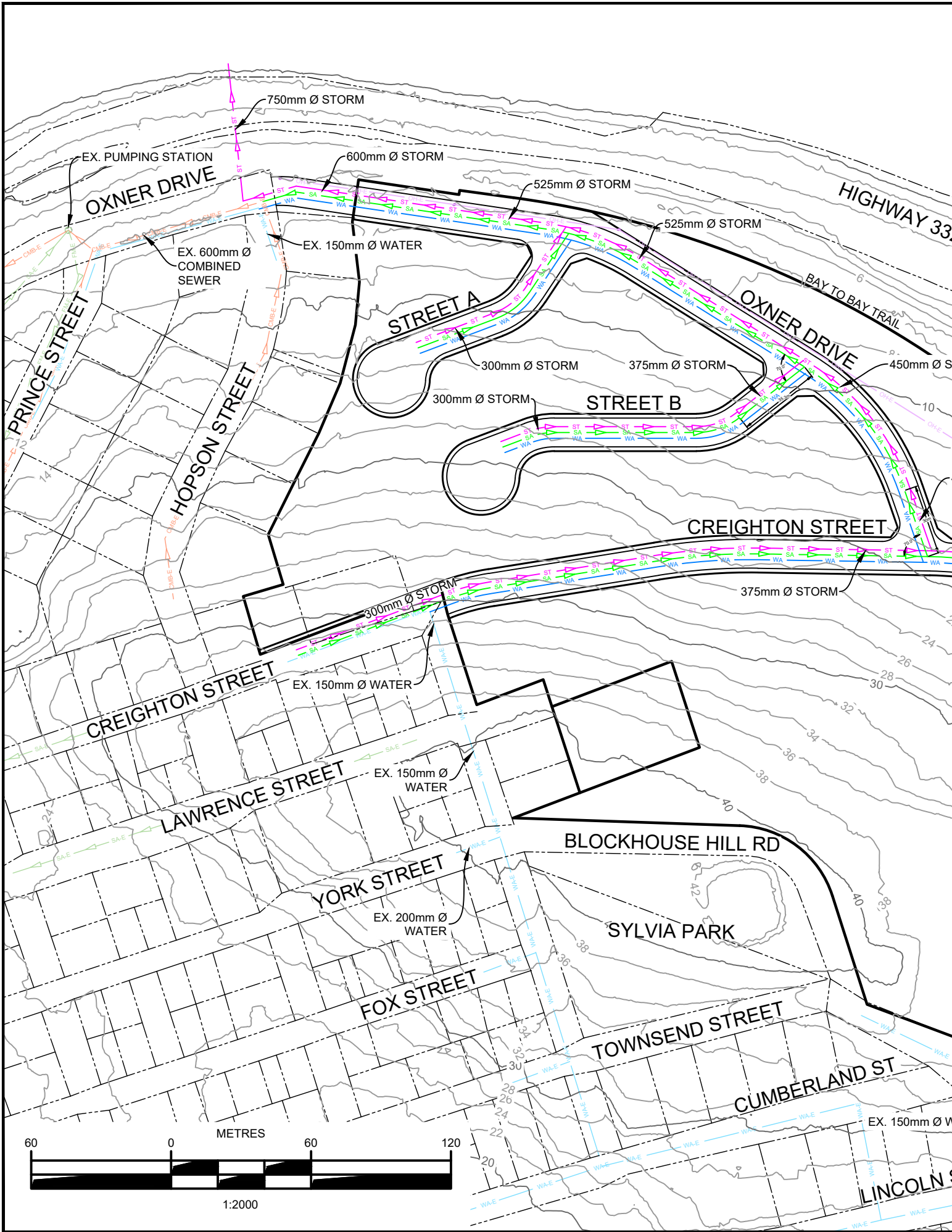
**DESIGNPOINT**  
engineering • surveying • solutions

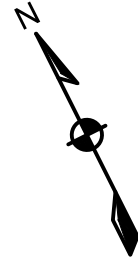
### PROJECT DESCRIPTION

BLOCKHOUSE HILL  
DEVELOPMENT  
OPTION 1 - SERVICING  
SCHEMATIC

LUNenburg, NOVA SCOTIA

PROJECT NO.	DATE	DRAWING SCALE
23-435	Jan. 11, 2024	1:2000





# BACK HARBOUR

2 (BYPASS RD)

TORM

450mm Ø STORM

EXISTING POWER EASEMENT

375mm Ø STORM

300mm Ø STORM

300mm Ø STORM

HARBOUR VIEW HAVEN

SAWPIT ROAD

WATER

STREET

EX. 150mm Ø WATER

## NOTES

1. CONTOURS SHOWN AT 2m INTERVAL, BASED ON PROVINCIAL LIDAR DATA.
2. THIS PLAN IS PRELIMINARY ONLY AND IS SUBJECT TO APPROVAL AND DETAILED DESIGN.
3. MINIMUM GRAVITY SANITARY MAIN TO 250mm
4. MINIMUM WATER MAIN TO BE 250mm.
5. MINIMUM STORM MAIN TO BE 300mm.
6. PIPES SIZING IS APPROXIMATE AND SUBJECT TO DETAILED DESIGN AND MODELING + APPROVALS

## CLIENT

MACKAY-LYONS  
SWEETAPPLE  
ARCHTETS LIMITED

## CONSULTANT

**DESIGNPOINT**  
engineering • surveying • solutions

## PROJECT DESCRIPTION

BLOCKHOUSE HILL  
DEVELOPMENT  
OPTION 2 - SERVICING  
SCHEMATIC

LUNENBURG, NOVA SCOTIA

PROJECT NO.

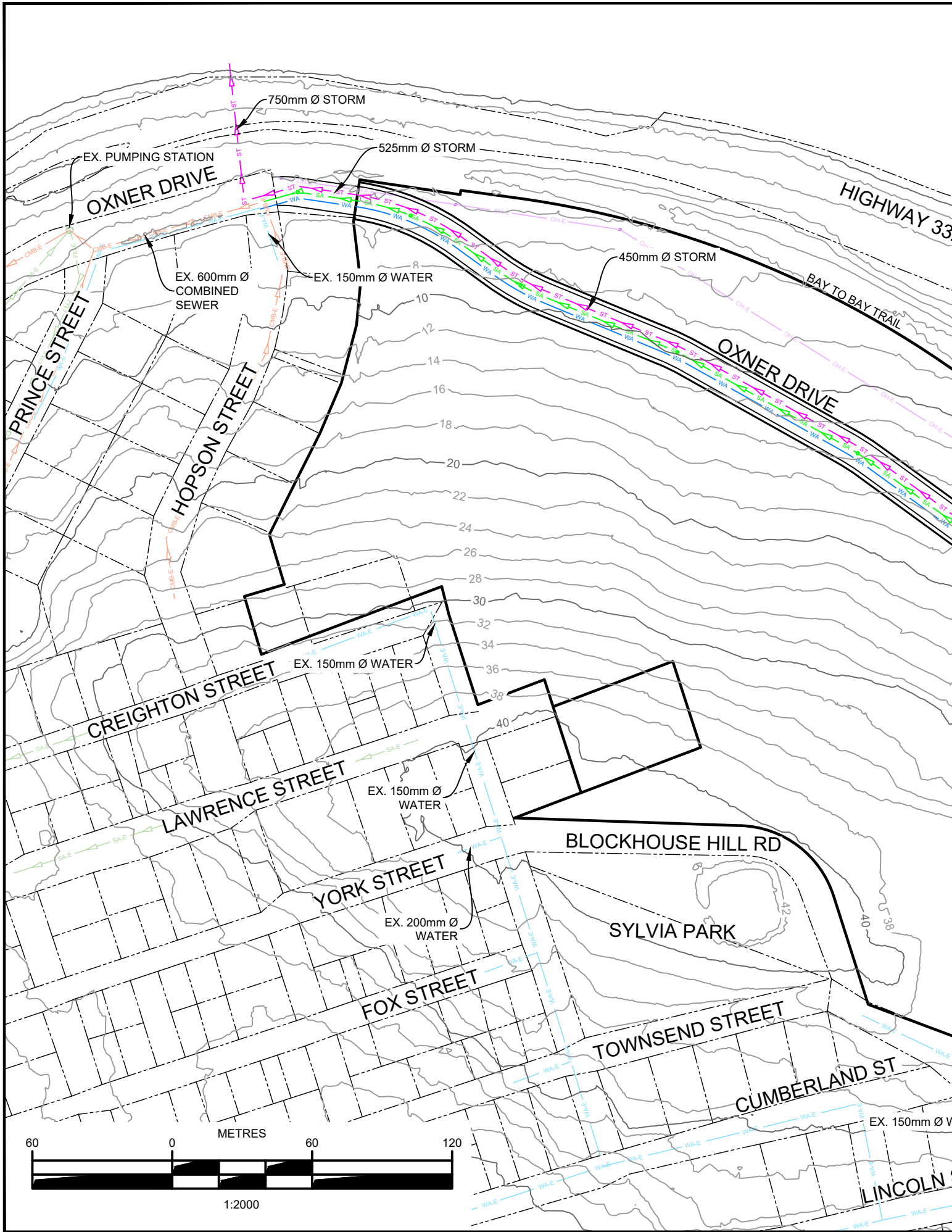
DATE

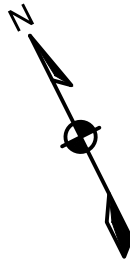
DRAWING SCALE

23-435

Jan. 11, 2024

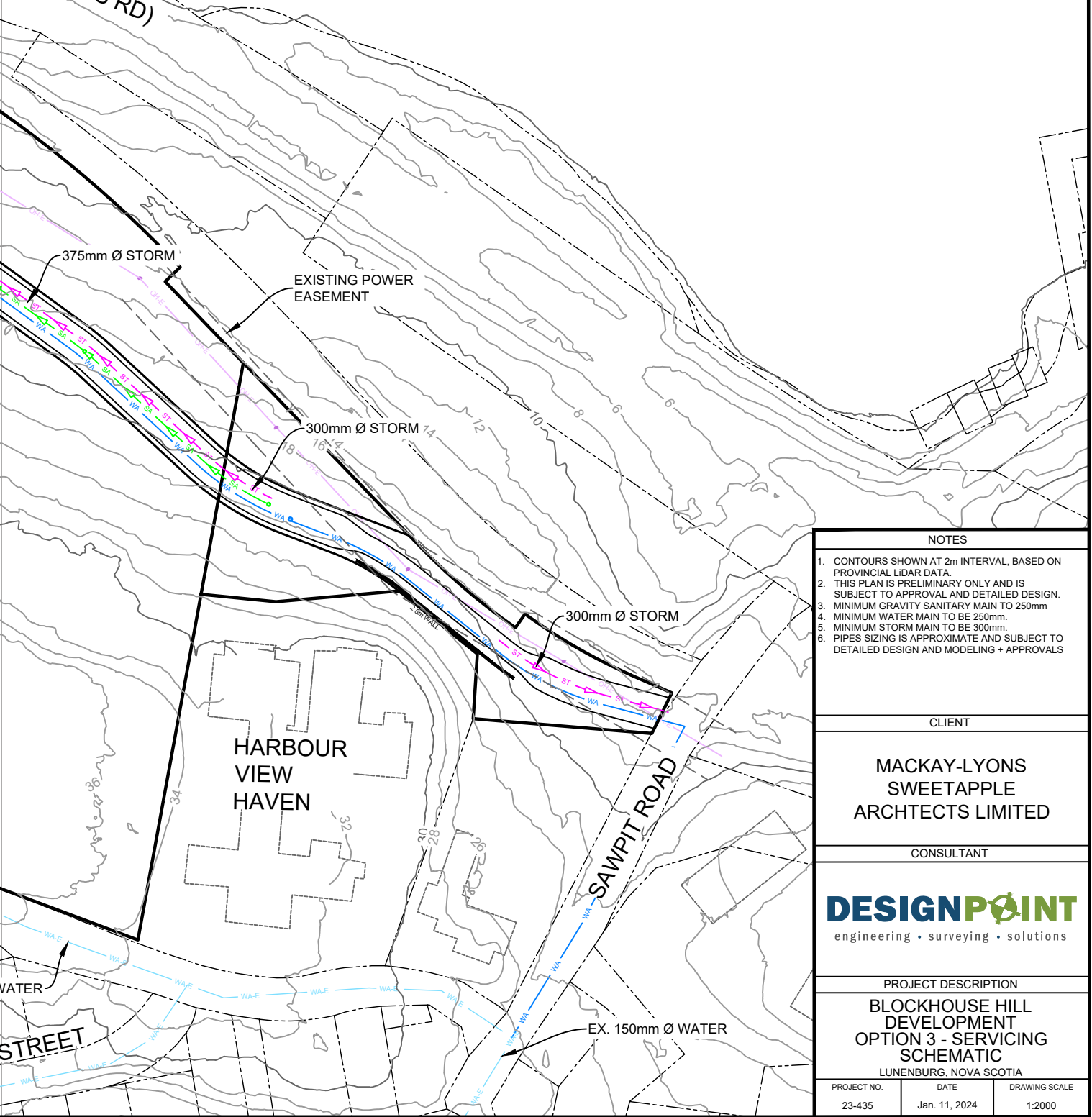
1:2000





# BACK HARBOUR

2 (BYPASS RD)



### NOTES

1. CONTOURS SHOWN AT 2m INTERVAL, BASED ON PROVINCIAL LIDAR DATA.
2. THIS PLAN IS PRELIMINARY ONLY AND IS SUBJECT TO APPROVAL AND DETAILED DESIGN.
3. MINIMUM GRAVITY SANITARY MAIN TO 250mm
4. MINIMUM WATER MAIN TO BE 250mm.
5. MINIMUM STORM MAIN TO BE 300mm.
6. PIPES SIZING IS APPROXIMATE AND SUBJECT TO DETAILED DESIGN AND MODELING + APPROVALS

### CLIENT

MACKAY-LYONS  
SWEETAPPLE  
ARCHTETS LIMITED

### CONSULTANT



### PROJECT DESCRIPTION

BLOCKHOUSE HILL  
DEVELOPMENT  
OPTION 3 - SERVICING  
SCHEMATIC  
LUNENBURG, NOVA SCOTIA

PROJECT NO.	DATE	DRAWING SCALE
23-435	Jan. 11, 2024	1:2000

January 15, 2024

**Mackay Lyons Sweetapple**

1715 Lower Water Street, Suite 130,

Halifax, NS B3J 0J4

Attention: Miranda Bailey, MArch, BEDS, BSc, NSAA

**RE: Servicing Review for Proposed Development of Blockhouse Hill**  
 DesignPoint Project #: 23-435

**Introduction**

We understand that the Town of Lunenburg (Town) has intentions to facilitate the development of the Blockhouse Hill site (PIDs 60056991, 60056900, 60056892, and 60671427) on Blockhouse Hill Road in Lunenburg. MacKay-Lyons Sweetapple Architects Limited (MLSA) has been retained by the Town to produce four (4) development schemes for the project site, designed with consideration given to both site limitations and public feedback. It is understood that at this time, land use in the preliminary development schemes range from low-density housing (i.e. single-family homes) to medium-density housing (i.e. stacked townhomes), and also includes parkland.

MLSA has retained DesignPoint Engineering & Surveying Ltd. (DesignPoint) to complete the civil servicing and grading review for the proposed development schemes. As part of this work, we have reviewed the existing water, wastewater, and stormwater systems in the area adjacent to the site to determine the level of service the development can receive and to determine any necessary upgrades to facilitate the development.



Figure 1: Blockhouse Hill Site Location.

**Water Servicing**

CBCL Limited (CBCL) was retained by the Town to complete a Water & Sanitary/ Storm System Development Master Plan for the Town of Lunenburg. This master plan includes a Water Distribution System Assessment (draft copy dated June 29, 2023). Results of the Water Distribution System Assessment were reviewed as part of the water servicing review for Blockhouse Hill. Due to the recency of this study and the fact that the Blockhouse Hill area was specifically assessed, a model of the Town water network has not been completed as part of this water servicing review.

Based on the CBCL Water Distribution System Assessment (2023) and GIS data provided by the Town, it is understood that the existing water network consists of a single pressure zone that is supplied via gravity from the Water Treatment Plant (WTP) storage reservoir, which is located northwest of the town center at 524 Northwest Road. Water leaving the reservoir travels through an existing 300 mm asbestos cement (AC) transmission main, which spans from the storage reservoir at the WTP to an existing standpipe at 57 Hospital Road in the Garden Lots. All flow to High Liner Foods, which is the largest consumer of municipal water (CBCL, 2023), passes through the in-line standpipe. The standpipe helps in peak balancing for High Liner Foods, and in situations where system pressure drops the standpipe can also supply water back to the distribution system. The serviced area of Lunenburg is supplied via a network of water mains ranging in size from 100-250 mm diameter.

Existing elevations throughout the Blockhouse Hill development area range between approximately 3-43 m. Potential connection points to the existing network include the following:

- Oxner Drive at Hopson Street – existing 150 mm main;
- Creighton Street at the east end – existing 150 mm main;
- Kempt Street at Lawrence Street and York Street – existing 150 mm main; and
- Blockhouse Hill Road, west of Civic 25 (Harbour View Haven) – existing 150 mm main; and
- Sawpit Road at Blockhouse Hill Road – existing 150 mm main.

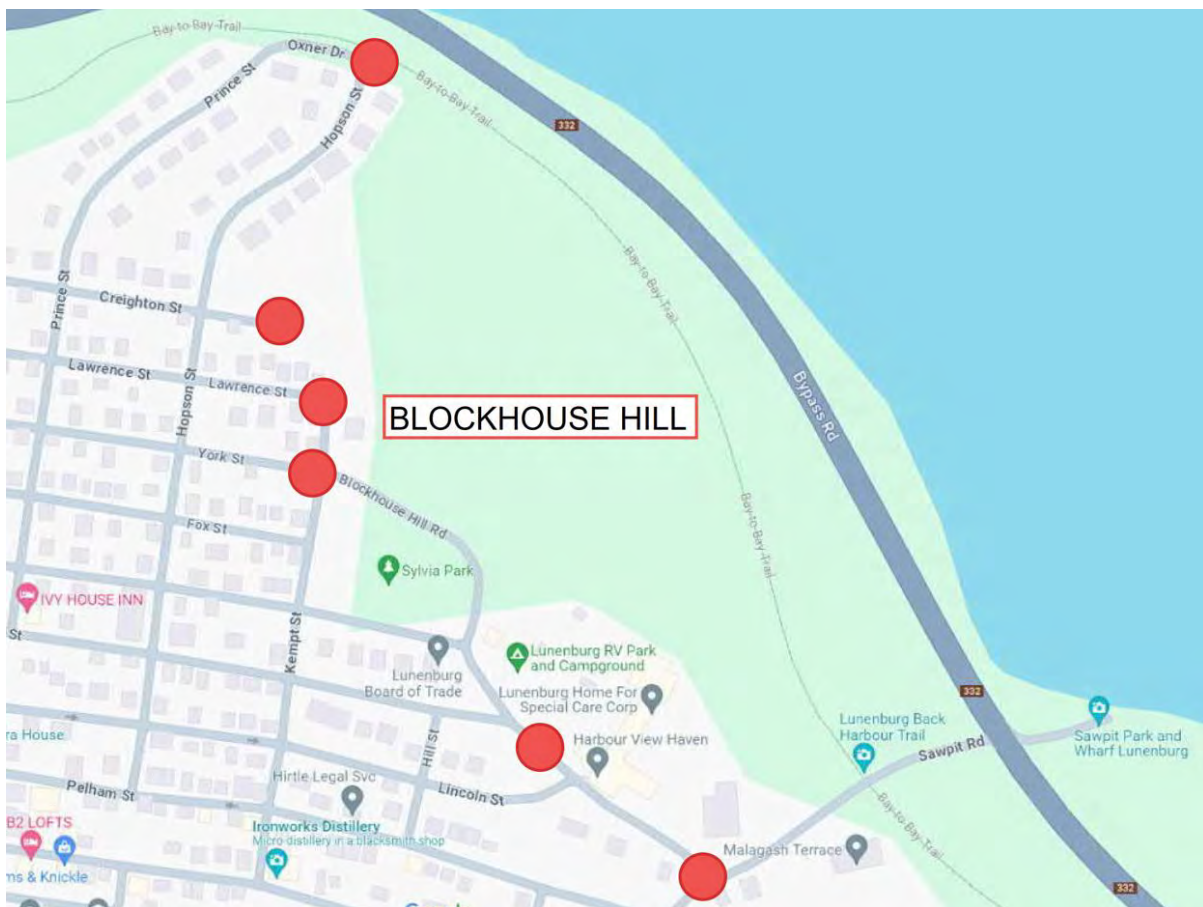


Figure 2: Potential Connection Points to Existing Water Network

Proposed connections to existing are dependant on the road and lot fabric proposed for each development scheme.

#### System Flow Testing

To better understand the hydraulic characteristics of the system under various flow demands and to help confirm the results of the CBCL study, a hydrant flow test was conducted by Aqua Data Atlantic on November 21, 2023 as part of this servicing review. The test was conducted on Kempt Street and involved measuring the static pressure, opening and measuring flow from the existing hydrant at the intersection of Kempt Street and York Street, and measuring the residual pressure at the existing hydrant at the intersection of Kempt Street and Fox Street. The results of this hydrant flow test are attached.

Additionally, as part of the Water Distribution System Assessment (2023), CBCL has completed several hydrant flow tests throughout the Town. Hydrant flow tests were completed by CBCL and incorporated into a water model of the existing distribution system.

#### Domestic Analysis

Domestic demands were calculated for the four (4) preliminary development schemes for the site. As per the 2022 edition of the Atlantic Canada Water and Wastewater Association (ACWWA) Water Supply Guidelines, an average daily demand of 410 liters per capita per day was used to determine theoretical domestic demands for the proposed development.

Based on the preliminary development schemes, all proposed housing is low to medium density, consisting of single-family homes, semi-detached units, and townhomes. The total unit count varies with each development scheme, from zero (0) units in development scheme 4 (“Park”) to 368 units in development scheme 1 (“Town Square”). A unit density of 3.35 people per unit was assumed for the proposed development, as this unit density is the industry standard for low to medium-density housing.

Peaking factors for maximum daily demand and peak hourly demand were applied to the average daily demand as per the ACWWA Water Supply Guidelines (2022). The Water Supply Guidelines specify peaking factors based on total population, with different peaking factors provided for certain population ranges. Based on 2021 census data from Statistics Canada, the Town of Lunenburg has a population of approximately 2,396. With the addition of the theoretical population from the proposed development, the estimated total population including the additional population from the proposed development ranges from 2,966 to 3,629. These population ranges correspond to the Water Supply Guidelines ranges of 2,001-3,000 and 3,001-10,000, respectively. The appropriate peaking factor corresponding to the calculated total population as per the Water Supply Guidelines was used to determine theoretical water demands for maximum daily demand and peak hourly demand scenarios.

The theoretical water demands for each development scheme based on the concept plans provided to DesignPoint by MLSA on January 7, 2024 are summarised in the following table:

Table 1: Theoretical Water Demands

	Unit Count (Theoretical Pop.)	Average Daily Demand	Maximum Daily Demand	Peak Hourly Demand
<b>Development Scheme 1</b> "Town Square"	368 (1,233)	505 m <sup>3</sup> /day	1,011 m <sup>3</sup> /day	63 m <sup>3</sup> /hour
<b>Development Scheme 2</b> "Out of Sight"	256 (858)	352 m <sup>3</sup> /day	703 m <sup>3</sup> /day	44 m <sup>3</sup> /hour
<b>Development Scheme 3</b> "Commons Crescent"	170 (570)	233 m <sup>3</sup> /day	525 m <sup>3</sup> /day	33 m <sup>3</sup> /hour
<b>Development Scheme 4</b> "Park"	0 (N/A)	N/A	N/A	N/A

The Water Supply Guidelines (2022) identifies ideal operating pressures to be between 50-70 psi (350-480 kPa) in a water distribution system. The Water Supply Guidelines also state a minimum allowable pressure of 40 psi (275 kPa) and a maximum allowable pressure of 100 psi (700 kPa) during domestic demand scenarios.

Based on CBCL’s Water Distribution System Assessment (2023), the existing system is typically supplied by the WTP storage reservoir during domestic demands. The assessment indicated that upon calibration of the water model, a tank level of 66.6 m (219 ft) was used for the storage reservoir.

The attached hydrant flow test noted a static pressure of 42 psi (290 kPa) in the residual hydrant at the time of the test. Provincial LiDAR data was used to review existing topography in the development area, and based on provincial LiDAR data the approximate ground elevation at the residual hydrant is 36 m. This elevation and measured static pressure corresponds with an approximate hydraulic grade line (HGL) of 65.5 m (215 ft), which corresponds well with the typical operating HGL of 66.6 m for the WTP storage reservoir (CBCL, 2023).

The CBCL assessment included the development of a hydraulic model for the full water system in the Town of Lunenburg, which allowed for a detailed assessment of the Blockhouse Hill development. As this assessment has already been completed, this report references the results from the CBCL study and provides additional commentary based on the information included in the four (4) development schemes.

As detailed in CBCL’s Water Distribution System Assessment (2023), development should be limited to ground elevations of 33 m and lower if minimum pressures are to be at or above 40 psi (275 kPa). Based on a static HGL of 66.6 m, the lands within the project area which are lowest in elevation are expected to have static pressures of approximately 90 psi. This is within the allowable range as specified in the ACWWA Water Supply Guidelines (2022).

It is also noted that depending on the age, material, and overall condition of the existing pipes in the area adjacent to the development site, the additional demand as a result of the proposed development will increase losses in the existing pipes due to friction, subsequently lowering the HGL as supply moves toward the development site. It is recommended to incorporate the additional theoretical water demand for the finalized development scheme(s) into the Town water model to assess impacts on surrounding existing infrastructure and system HGL.

### Fire Flow Analysis

In addition to the domestic demand analysis, a high-level fire flow analysis was completed to assess the capacity of the existing system adjacent to the proposed development. As per the ACWWA Water Supply Guidelines (2022), fire flow requirements are to be determined in accordance with the latest edition of Water Supply for Public Fire Protection from the Fire Underwriters Survey (FUS) and the latest edition of M31 Distribution System Requirements for Fire Protection from the American Water Works Association (AWWA).

The ACWWA Water Supply Guidelines specify a minimum residual pressure of 22 psi (150 kPa) to be maintained at the flow hydrant, and a minimum system pressure of 20 psi (140 kPa). The Water Supply Guidelines also state a maximum allowable pipe velocity of 3.0 m/s during fire flows.

Preliminary fire flow requirements were calculated for each development scheme as per the 2020 edition of Water Supply for Public Fire Protection, published by the FUS. The following equation is used to calculate required fire flow as per the FUS (2020):

$$RFF = 220C\sqrt{A}$$

Where:

RFF = Required Fire Flow (Liters per minute, L/min)

C = Construction Coefficient (related to type of building construction)

A = Total Effective Floor Area (m<sup>2</sup>)

The FUS also provides guidance on applying reductions or charges to the required fire flow based on occupancy and contents, automatic sprinkler protection, and building exposure.

To determine fire flow requirements for the proposed development with a reasonable level of accuracy in accordance with the FUS, aspects of the detailed building design including the type of building construction and total floor area are required. To determine preliminary fire flow requirements for Blockhouse Hill, a “base scenario”, herein referred to as Scenario A, was assessed with conservative assumptions being made regarding building design and construction for the proposed development. The assumptions for Scenario A are summarized as follows:

1. Construction Coefficient of 1.5 used to represent “Wood Frame Construction”, which is described as “when structural elements, walls, arches, floors, and roofs are constructed entirely or partially of wood or other material” (FUS, 2020).
2. Total Effective Areas based on largest building footprints in each development scheme concept plan provided to DesignPoint by MLSA on January 7, 2024.
3. RFF reduction of 15% for residential occupancy.
4. No reduction to RFF on the basis of no automatic sprinkler protection.
5. Exposure adjustment charges made based on clearance from other buildings, as per development scheme concept plans provided to DesignPoint by MLSA on January 7, 2024.

Calculated maximum required fire flows for Scenario A were calculated for each development scheme and rounded to the nearest 1,000 L/min. This resulted in substantial maximum required fire flows, with a maximum fire flow requirement of 18,000 L/min for Development Schemes 1 and 2. This required fire flow is larger than the maximum required fire flow referenced in the CBCL assessment (13,620 L/min) and is much larger than the typical required fire flow for multi-unit developments.

The preliminary fire flows calculated in Scenario A are substantial and impractical from both a municipal supply and fire fighting perspective. As such, it is recommended that additional measures be incorporated into the detailed design of the buildings to reduce the fire flow requirements. Maximum required fire flows have been calculated assuming the incorporation of select design and construction strategies, specifically inclusion of an automatic sprinkler system, incorporation of fire walls, and modification of the building construction type. The key differences between the additional scenarios are as follows:

- Scenario B: Add automatic sprinkler system (reduce RFF by 40%).
- Scenario C: Add automatic sprinkler system (reduce RFF by 40%) and incorporate fire walls (assumed maximum unprotected floor area of 4,800 ft<sup>2</sup> (446 m<sup>2</sup>)).
- Scenario D: Add automatic sprinkler system (reduce RFF by 40%), incorporate fire wall (assumed maximum unprotected floor area of 4,800 ft<sup>2</sup> (446 m<sup>2</sup>)), and modify construction type (use a Construction Coefficient of 1 for “Ordinary Construction”, described as “exterior walls are of masonry construction ... but with combustible walls and/or roof” [FUS, 2020]).

Calculated maximum required fire flows for each scenario were calculated for each development scheme and rounded to the nearest 1,000 L/min. The results of the analysis are summarised in Table 2 as follows:

Table 2: Maximum Required Fire Flows as per the FUS (2020)

	Required Fire Flow (L/min) Scenario A	Required Fire Flow (L/min) Scenario B	Required Fire Flow (L/min) Scenario C	Required Fire Flow (L/min) Scenario D
<b>Development Scheme 1</b> “Town Square”	21,000 L/min (4,755 usgpm)	16,000 L/min (3,700 usgpm)	8,000 L/min (2,645 usgpm)	6,000 L/min (1,850 usgpm)
<b>Development Scheme 2</b> “Out of Sight”	21,000 L/min (4,755 usgpm)	16,000 L/min (3,700 usgpm)	8,000 L/min (2,645 usgpm)	6,000 L/min (1,850 usgpm)
<b>Development Scheme 3</b> “Commons Crescent”	18,000 L/min (3,435 usgpm)	14,000 L/min (2,645 usgpm)	7,000 L/min (1,850 usgpm)	5,000 L/min (1,325 usgpm)
<b>Development Scheme 4</b> “Park”	0 (N/A)	0 (N/A)	0 (N/A)	0 (N/A)

Depending on selected building design and construction strategies, preliminary required fire flows for Development Schemes 1 and 2 range between 6,000 L/min and 21,000 L/min, and range between 5,000 L/min to 18,000 L/min for Development Scheme 3.

The attached Water Flow Test Summary graph enclosed with the hydrant flow test indicates that pressure at the residual hydrant would be approximately 22 psi when drawing 13,620 L/min of flow from the flow hydrant. For Scenario A, this complies with the pressure requirements during fire flow for Development Scheme 3 in all scenarios, and Scenarios C and D for Development Schemes 1 and 2. The hydrant flow test results indicate that at the maximum required fire flow of 21,000 L/min, residual pressures would be below 22 psi and therefore not meet pressure requirements as per the ACWWA Water Supply Guidelines.

Results of the Water Distribution System Assessment (CBCL, 2023) indicated that fire flow available to the Blockhouse Hill parcel is limited to 2,900 L/min (766 usgpm) before fire flow requirements are not met within the existing system. This available fire flow does not meet the fire flow requirement for Development Schemes

1-3 for any of the building construction scenarios. The Water Distribution System Assessment identifies one of the main constraints regarding available fire flow to be low service pressures in specific serviced areas, with the lowest observed pressures in the high-elevation area on Green Street. It is also noted that the Garden Lots standpipe provides fire flow and can supply the system when the HGL drops, however the standpipe has a typical operating water level that is approximately 4.7 m lower than that of the WTP storage reservoir (CBCL, 2023). Low service pressures in high-elevation areas and water levels in the standpipe contribute to system pressure issues during fire flow scenarios.

Small diameter pipes will also impact available fire flow due to pipe velocity constraints. Based on GIS provided by the Town, the project area is surrounded by existing 150 mm water mains. Experience has shown that to supply large fire flows such as these, typically a single supply via a minimum 350 mm diameter water main or a looped supply from minimum 300 mm diameter water mains is required. With no upgrades to the existing pipe network, velocity requirements will likely also limit available fire flow to the development site notwithstanding the previously noted system pressure issues.

CBCL's Water Distribution System Assessment (2023) assessed system performance for several upgrades to the existing linear system. This included upgrades to the existing transmission main, the replacement of existing pipes adjacent the proposed development along Kempt Street and Blockhouse Hill Road, and extending the existing system to create a loop connecting Sawpit Road and Oxner Drive. Details on model results and subsequent recommendations by CBCL are referenced in the Water Distribution System Assessment. These upgrades resulted in available fire flows exceeding 13,620 L/min for Blockhouse Hill (CBCL, 2023).

As previously discussed, the maximum required fire flow for the proposed development schemes is 21,000 L/min for Scenario A, which is an excessive flow that greatly exceeds the maximum fire flow used in the CBCL assessment. As previously discussed, building construction and design will ultimately inform the maximum required fire flow for the chosen development scheme. As outlined in Scenarios B-D, the required fire flow should be reduced through modifications to building designs and concept plans. Reduction strategies for required fire flow include incorporating automatic sprinkler systems, adding fire walls, increasing the distance between proposed structures, and/or modifying the type of construction (i.e. constructing buildings with materials with a minimum 1-hour fire resistance rating). A number of these design strategies and their impacts on required fire flow were covered in Table 2. Additionally, the FUS (2020) provides a detailed reference on the factors that impact the required fire flow for a structure and their implications.

It is also noted that the currently proposed development schemes include additional street connections than what was assumed in the CBCL assessment, and therefore more connections to the existing water network are expected. With the additional connections, it is possible that the existing water network will not require the same level of upgrades as identified in the CBCL assessment to deliver the required fire flow. Once the preferred development scheme is chosen and the street connections and building types are determined, the proposed development should be incorporated into the hydraulic water model for the entire Town system. The fire flow analysis can then be re-run to confirm the required upgrades for the chosen development scheme.

## Wastewater Servicing

As part of this analysis, DesignPoint has reviewed the capacity of the existing combined gravity sewer between the proposed development and the Back Harbour Pumping Station, as well as the capacity of the Back Harbour Pumping Station itself. This analysis included on-site drawdown testing to determine actual pump discharge rates of the pumping station. Remedial measures to the combined sewer system between the development and the Back Harbour Pumping Station were then assessed to account for the increased wastewater flows from

the proposed development. The capacity and operational assessment of the remainder of the Town's wastewater system downstream of the Back Harbour Pumping Station was not included as part of this analysis.

#### Wastewater System Review

The combined sewer system in the area ultimately drains into the Back Harbour Lift Station, situated at the corner of Oxner Drive and Prince Street. The existing sewershed was delineated for the current combined sewer system in order to establish the existing theoretical peak wastewater flows tributary to the system. Existing and proposed wastewater flows were calculated based on the following criteria, in accordance with the Lunenburg Specifications for Subdivision 2021:

- Wastewater generation rate 340 L/day/cap;
- Infiltration and inflow allowance of 12,096 L/day/ha (0.14 L/s/ha) and;
- Peaking based on Harmon Peaking Factor.

Given that the current gravity system functions as a combined sewer system, a stormwater analysis was also completed to estimate theoretical stormwater flows to the system. Typically, storm sewers are designed to accommodate the 1-in-5-year return period storm event and as such, the 1-in-5-year return period storm was used for this analysis.

Calculations were completed to determine the additional wastewater flows for each of the development scenarios. The scenario which generates the largest wastewater flow was used to assess the impacts to existing infrastructure and determine potential upgrades that would be required to accommodate the new development. Combined sewer separation methods were also assessed to offset the additional flows of the proposed development to the downstream system.

#### Linear System Assessment

The existing gravity sewer within the study area consists of 90 m of 600 mm diameter concrete pipe and is illustrated on sheet C-SA01 attached. The estimated wastewater flows tributary to the current combined system represent only a small portion of the system capacity, reaching a maximum of 1% of the pipe capacity during theoretical peak flow conditions. Detailed calculations showing the wastewater flows tributary to the pipes and lift station within the study area are shown on sheet C-SA01.

In addition to the theoretical wastewater flow calculations, an analysis of the potential stormwater flow entering the combined system was also completed. Stormwater enters the combined system through various catch basins in the area, then ultimately drains to the Back Harbour lift station. To complete this analysis, drainage boundaries were determined using provincially available LiDAR elevation data and the GIS data supplied by the Town of Lunenburg. The catchment boundaries established the design parameters used in the hydrologic modelling software, HydroCAD.

HydroCAD is a commercially available software which uses the SCS method to determine peak runoff rates. As previously discussed, the 1-in-5-year return period was used for the purposes of this analysis, as it represents the standard design parameters for a typical stormwater sewer. The catchment areas used in the stormwater calculations are shown on sheet C-ST01 attached. The estimated peak stormwater flows tributary to the combined system in this study area are shown in Table 3 below. For the purposes of this study the entire 1-in-5-year flow is assumed to get into the system. These flows were then added to the previously calculated wastewater flows to establish the peak theoretical wet weather flows. It is noted that the actual stormwater flows tributary to the Back Harbour Lift Station are likely limited by existing pipe and catch basin inlet capacities.

Table 3: Flows Tributary to the Combined System

Infrastructure	Peak Stormwater Runoff L/s (1-in-5-Year Flow)	Pre-Development Peak Dry Weather Flow (L/s)	Post-Development Peak Dry Weather Flow (L/s)
Pipe 1	152.0	0.9	23.4
Pipe 2	948.0	6.9	28.5
Back Harbour Lift Station	1316.7	10.7	31.8

Pipe 1 is an existing 600 mm diameter concrete pipe. The provided GIS information does not include an invert for the upstream side of Pipe 1 so a pipe slope of 1.00% was assumed for the purposes of this analysis. This results in a Manning’s capacity of 615.8 L/s. The existing peak dry weather flow to this pipe is 0.9 L/s, which increases to 23.4 L/s at full buildout. The stormwater reaching Pipe 1 during a 1-in-5-year rainfall event was calculated to be 152 L/s. This results in a total combined flow of 175.4 L/s during a 1-in-5-year rainfall event. Based on the assumed conditions this pipe currently has capacity to support both the pre-development and post-development combined flows.

Pipe 2 is an existing 600 mm diameter concrete pipe with a slope of 1.83% and has a Manning’s capacity of 830.5 L/s. The existing peak dry weather flow to this pipe is calculated to be 6.9 L/s, which increases to 28.5 L/s at full buildout. The stormwater reaching Pipe 2 during a 1-in-5-year rainfall event was determined to be 948 L/s. This results in a total combined flow of 976.5 L/s during a 1-in-5-year rainfall event. This peak combined flow is greater than the pipe capacity. However, as the pre-development flow to Pipe 2 is 954.9 L/s during a 1-in-5-year rainfall event, this pipe is undersized for the existing conditions as well. In its current condition the pipe can handle the peak dry weather flow of 6.9 L/s and an additional 823.6 L/s or 87% of the calculated stormwater flow.

As Pipe 2 is currently undersized, flows should not be increased to this pipe. Combined sewer separation should be completed to offset the additional wastewater flows being added by the proposed development. For similar combined sewer separation projects in the past, a ratio of 2:1 was recommended for flow removal. This means that the amount of stormwater flow removed from the system needed to be at least twice the amount of the wastewater flow being added. It is proposed that this project use the same offsetting approach. To accomplish this, it is recommended that the two catch basins at the corner of Oxner Drive and Hopson Street as well as the stand alone catch basin at the corner of Oxner Drive and Prince Street be removed from the combined system. All three catch basins should be redirected to the nearby ditch on the north side of Oxner Drive, which drains to Back Harbour. The removal of these three catch basins would equate to the removal of 78.3 L/s of stormwater during the 1-in-5-year rainfall event. The proposed development will add 24.0 L/s of peak wet weather wastewater flow, so the removal of these three catch basins sufficiently offsets the flow from the proposed development by more than 2:1.

**Back Harbour Pumping Station Assessment**

Record information was supplied by both the Town and the pump supplier for the existing Back Harbour Pumping Station, which indicated that the station has a theoretical firm capacity of 15 L/s. To confirm the theoretical capacity, DesignPoint completed drawdown testing at the station to determine the actual current operating conditions of each pump (January 4, 2024). The results from the drawdown testing can be seen in Table 4 below. Also, the theoretical pump and system curve for the station can be seen in Figure 3.

Table 4: Drawdown Testing vs Theoretical Pump Discharge Rates

Pump ID	Measured Discharge Rates from Drawdown Testing (L/s)	Theoretical Discharge rates (L/s)
Pump 1	9.9	15.0
Pump 2	12.3	15.0
Pump 1 & 2	12.6	19.4

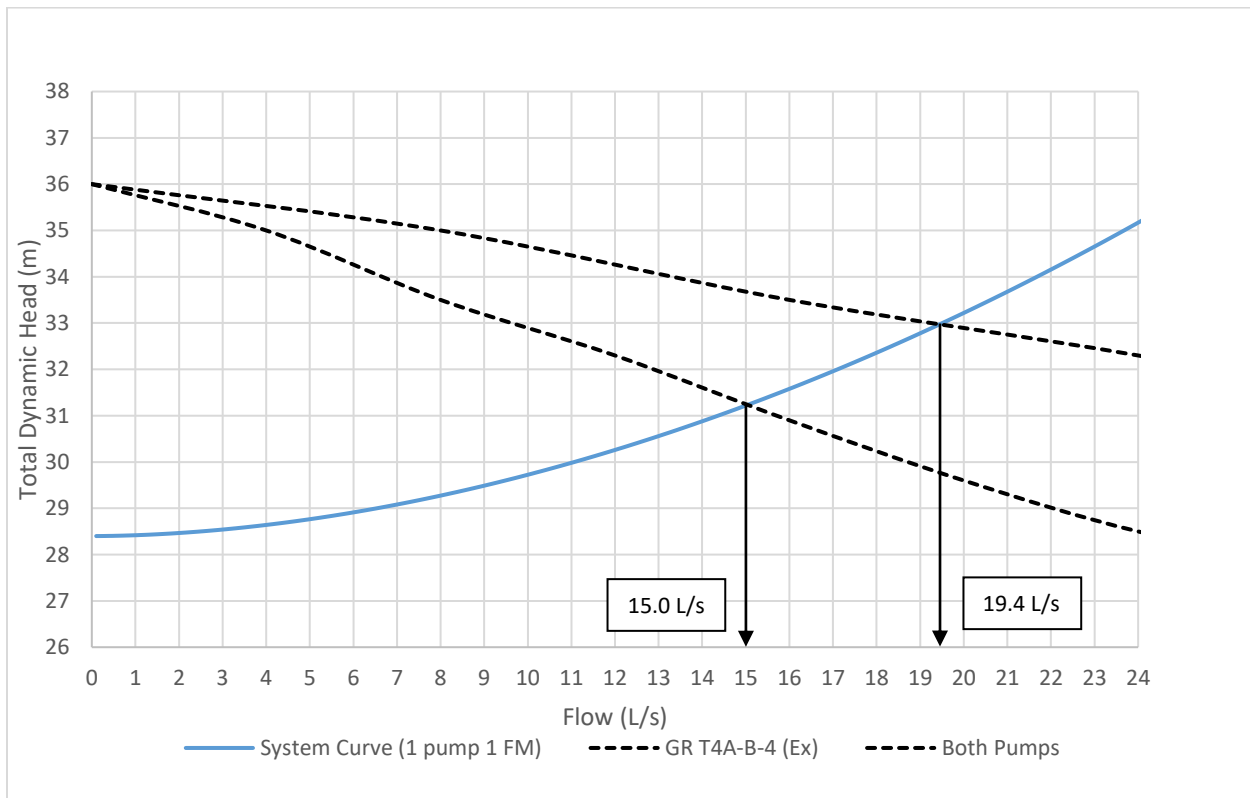


Figure 3: Back Harbour Lift Station- Theoretical Existing Operating Conditions

The results from the drawdown testing determined that the discharge rate of Pump 1 was 9.9 L/s, and the discharge rate of Pump 2 was 12.3 L/s, which are lower than the design operating point of 15.0 L/s. Therefore, the actual firm capacity of the existing Back Harbour Lift Station is currently 9.9 L/s. This discrepancy in pump discharge rate could be a result of numerous factors. Some possible issues could be buildup in the existing force main, a partially closed gate or check valve, and wear or damage to the pump impellers. It is recommended that the town perform system diagnostics and maintenance on both pumps, to increase the existing firm capacity to be closer to 15 L/s.

The existing theoretical peak dry weather flow to the station was determined to be 10.7 L/s. During wet weather conditions, the peak stormwater flow tributary to the existing pumping station was calculated to be 1316.7 L/s following a 5-year rainfall event as seen in Table 3. This results in a total theoretical combined peak wet weather flow of 1327.4 L/s during a 5-year rainfall event.

It is not typical to design pumping stations to fully convey peak stormwater runoff rates for combined systems as the flows to pumping stations during a rainfall event are typically many orders of magnitude larger than the wastewater flow rates. As a result, pumping stations which receive flows from combined systems frequently experience overflows. Through a federal mandate by the Canadian Council of Ministers of the Environment (CCME), there is to be no net increase in the frequency, duration, or peak flow rate of overflows because of development. Therefore, as discussed in the previous section, sewer separation efforts are recommended to offset the additional flows being added by the development.

Assuming that maintenance is performed on the pumps and the station is operating at the design capacity of 15 L/s, 71 units can be constructed at the proposed development before the theoretical peak dry weather flow exceeds the existing pumping station's firm capacity. Based on discussion with the pump supplier, it is understood that it may be possible to increase the operating speed of the existing pumps such that the new pump discharge rate would be 18.9 L/s. This would consist of very minor mechanical upgrades to the existing belts and shivs within the pumps themselves. This relatively inexpensive station upgrade would allow 137 units to be developed prior to exceeding the station firm capacity.

If more than 137 units are constructed, significant upgrades to the pumping station will be required. Preliminary station sizing was determined using the largest design scheme of 368 units. This development scheme would result in a theoretical peak dry weather flow of 31.8 L/s. To support this increased flow, the pumps within the station would need to be upgraded from the existing 7.5 hp pumps to approximately 20.0 hp. A new control building would be required to house the pumps, and a new wet well would be required for the suction piping. Emergency power, in the form of a new permanent on-site generator would also be a potential requirement.

As discussed, a reason for the discrepancy between the measured pump discharge rates and the theoretical operating points of the pumps could be due to the condition of the existing force main. Therefore, upgrades to the existing 150 mm force main should also be considered. The existing force main is approximately 400 m in length and discharges into an existing manhole on Fox Street. Replacement of this force main would have impacts to the existing street infrastructure and could increase construction costs. Upsizing the force main from 150 mm to 200 mm would reduce friction losses in the system and reduce the size of the pumps required at the station. This would also reduce the power requirements of the electrical infrastructure, reducing the infrastructure cost at the lift station itself.

The cost of constructing a new pumping station of this size and replacing the force main is estimated to be 1.5M dollars. Exact pricing and design parameters of this future pumping station and force main replacement are subject to detailed design and which design scheme is approved.

## Stormwater Servicing

### Existing Site Characteristics

The existing project site is primarily undeveloped and tree/shrub covered, with one section having been previously cleared and developed as a recreational vehicle park and campground. The existing site generally grades from the high point at the southwestern corner down to the Bay to Bay Trail and ultimately to the Back Harbour. Existing grades are flatter near the top / southwestern portion of the site, with most of the site having 15-20% slopes beyond that area. Elevations for the site currently range from approximately 3-43 m.

#### Proposed Development

There are currently four proposed development schemes for this project, three of which include the construction of new roads/lots and municipal servicing, including underground piped stormwater systems. For land development projects such as these, the post-developed site generally produces more surface runoff compared to the pre-development site due to increased impervious area and reduced infiltration. To account for the increased runoff, land development projects typically need to “balance” pre- and post-development peak runoff rates, meaning that the post-development peak flow rates are no larger than the pre-development rates. This is accomplished through stormwater detention/retention measures, such as ponds, underground storage, etc. The balancing of peak flows is a requirement by Nova Scotia Environment and Climate Change (NSECC), and its purpose is to help prevent additional erosion and to not increase the hydraulic loading on existing infrastructure downstream of the project site.

In instances where development projects can discharge runoff directly from the site to the ocean, it has been DesignPoint’s experience that NSECC does not require the peak flow rates to be balanced, meaning that stormwater detention/retention is not explicitly required. While the Blockhouse Hill site is not directly adjacent to the Back Harbour, the only properties between the site and the ocean are publicly owned, being the Bay to Bay Trail and Highway 332.

As shown on the Servicing Schematics, it has been proposed that a new underground storm pipe system be installed which conveys and discharges runoff from the project site through a new outfall pipe directly to the ocean. This outfall pipe is proposed to be installed near the Oxner Drive / Hopson Street intersection to the Back Harbour, which requires crossing the Bay to Bay Trail and Highway 332. By constructing a stormwater system in this manner, runoff can be directly discharged to the ocean, negating the need for stormwater detention/retention measures. This pipe crossing / outfall will need to be approved by the various review agencies, which are expected to include the Town of Lunenburg, NSECC, and the Department of Fisheries and Oceans (DFO). It is noted that there may be an opportunity to utilize the existing drainage system in the area rather than construct a new outfall – this is subject to further review.

Development Schemes 2 and 3 also include a proposed stormwater system from a small area which discharges to the existing ditch system on Sawpit Road at the proposed street connection point. This existing ditch system conveys flow northeast towards Highway 332 and ultimately to the Back Harbour. Although this discharge point is not directly connected to the ocean, there are not expected to be any stormwater management measures required for this outfall. Compared to the overall drainage area that the downstream ditch along Highway 332 conveys runoff from, the size of the development’s drainage area tributary to this proposed outfall is extremely small. As such, there is not expected to be any noticeable impact to the runoff characteristics of this ditch system and therefore stormwater management measures are not expected to be required and are not currently proposed. Although measures are not expected to be required, detailed analysis of the downstream drainage system should be conducted as part of detailed design if Options 2 and 3 is the chosen option and is advanced further to confirm. This will also be subject to Town, NSECC, and possibly DFO approval.

## Summary

### Water System Review

As detailed, the existing water system has adequate capacity to service the proposed development with domestic supply up to finished grade elevations of approximately 33 m.

Based on calculations completed in accordance with the Fire Underwriters Survey, the required fire flows for the development schemes range from 5,000 – 21,000 L/min, depending on the building construction methods. It is recommended to implement several of the outlined measures to reduce the required fire flow, such as automatic sprinkler systems, masonry exterior walls, and fire walls within the buildings. The final required fire flows should be confirmed with a fire protection specialist.

Based on CBCL's Water Distribution System Assessment for the Town of Lunenburg, there is only approximately 2,900 L/min of fire flow available to the Blockhouse Hill area before minimum pressures are met elsewhere in the system. This available flow is less than the required fire flow for all development schemes regardless of building construction methods. To achieve the necessary fire flows for the proposed development, the existing transmission main in the system will need to be upgraded/upsized and the existing water mains adjacent to the proposed development will likely need to be upsized. It is recommended that the hydraulic model for the overall Town system be updated to confirm the required upgrades once the preferred development scheme, building construction methods, and water main connection points are determined.

### Wastewater System Review

A downstream analysis has been completed for the existing combined sewer system from the corner of Oxner Drive / Hopson Street to the Back Harbour Pumping Station. This analysis has determined that the existing combined system does not have adequate capacity to fully convey the existing peak wastewater flows and the peak stormwater flows for the 1-in-5-year rainfall event. As such, no increase in flows to the existing system can be allowed. To facilitate this development, it is recommended that a stormwater offsetting approach be used. To account for the anticipated wastewater flows from the development, it is recommended that three existing catch basins which currently discharge to the Back Harbour Pumping Station be disconnected from the combined system and discharged to the ditch system on the north side of Oxner Drive. The locations of these catch basins are shown on the attached drawing C-ST01.

The detailed review of the Back Harbour Pumping Station has determined that there is not currently capacity for any additional development. The pumps are operating lower than their theoretical operating points, and therefore system maintenance should be conducted to increase their operating points. With these improvements made and the stormwater offsetting completed, 71 units could be developed and connected to the system. With additional relatively inexpensive changes to the pumps (belt and shiv upgrades), a total of 137 units could be developed. To develop more than 137 units, more substantial upgrades to the existing pumping station and/or force main are required. For full build-out of the development scheme with the highest unit count (368 units), it is estimated that the required upgrades would cost approximately 1.5M dollars. Exact pricing and design parameters of this future pumping station and force main replacement are subject to detailed design and which development scheme is chosen.

### Stormwater System Review

It is proposed that runoff from the project site generally be discharged directly to the Back Harbour through a new outfall pipe, and therefore stormwater management infrastructure (ponds, underground storage, etc.) is not expected to be required. If Development 2 or 3 is chosen as the preferred option and the design is further

advanced, review of the downstream ditch/drainage system on Sawpit Road should be conducted. There are however not expected to be any offsite upgrades to facilitate the proposed development from a stormwater management perspective.

Approvals for the proposed stormwater system outfalls will be required from the Town of Lunenburg, NSECC, and DFO, depending on the location of the outfall.

Thank you,

**DesignPoint Engineering & Surveying Ltd.**



Logan King, P.Eng.

Water Resources Engineer & Principal

Enclosures:

- a. Hydrant Flow Test Results
- b. Downstream Wastewater Capacity Schematic C-SA01
- c. Storm Catchment Schematic C-ST01

# WATER FLOW TEST SUMMARY

Type of Area:	Residential / Commercial	Test No:	Test #1
Location:	Kempt St, Lunenburg, NS	Test By:	Roland Richard
Municipality:	Town of Lunenburg	Date:	November 21, 2023

**• SYSTEM DATA**

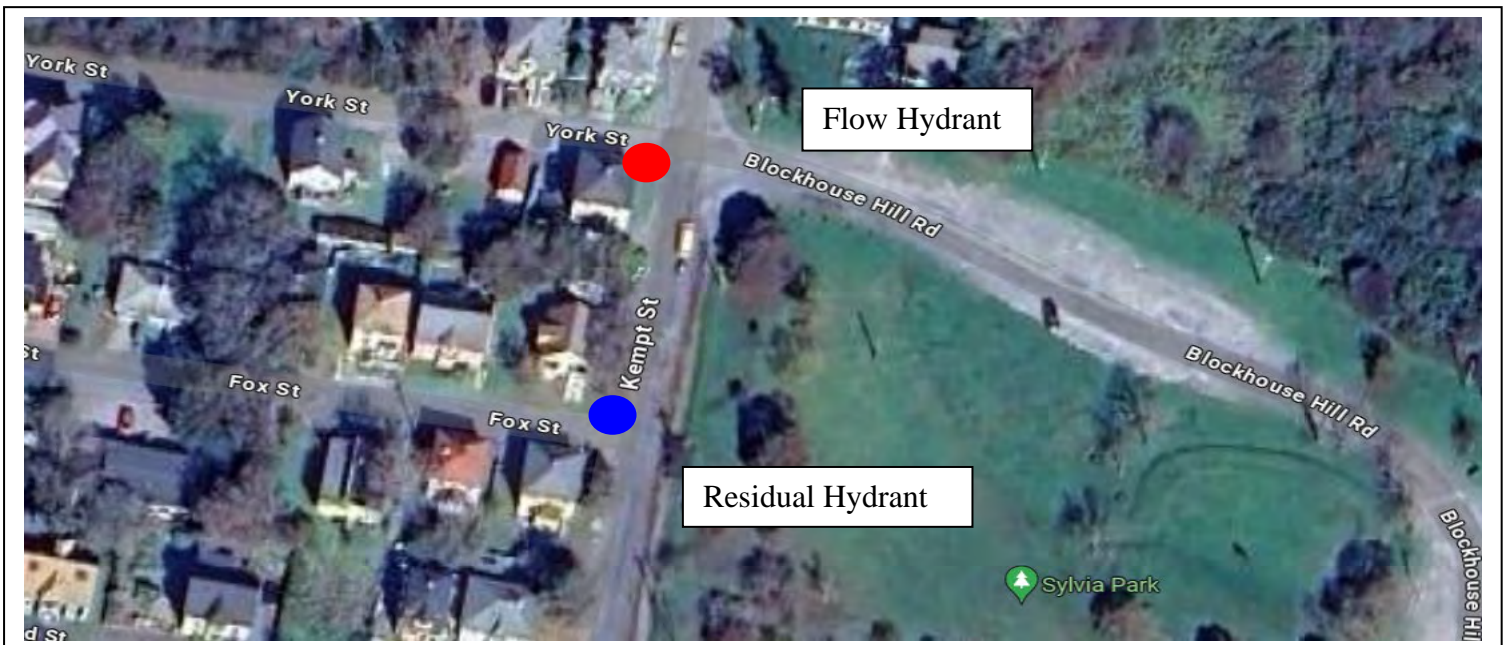
Size of Main:		Dead End:		Two Ways:		Loop:	
Source Reliable:			If not, explain:				
Comments:	Results are in US GPM and PSI. Hyd coefficient is 0.09						

**• TEST DATA**

Location of Test Hydrants: Residual:	See sketch below for location						
Flow:	See sketch below for location						
Normal Pressure:	42	Time:	9:00	A.M.	<input type="checkbox"/>	P.M.	<input checked="" type="checkbox"/>

Test No.	No. of Outlets	Orifice Size (IN)	Pitotless Nozzle Reading (PSI)	1003	Total Flow (US GPM)	Residual Pressure (PSI)	Comments
1	1	2.5"	10	529	529	42	
2	2	2.5"	6 / 6	415 / 415	830	40	
3							

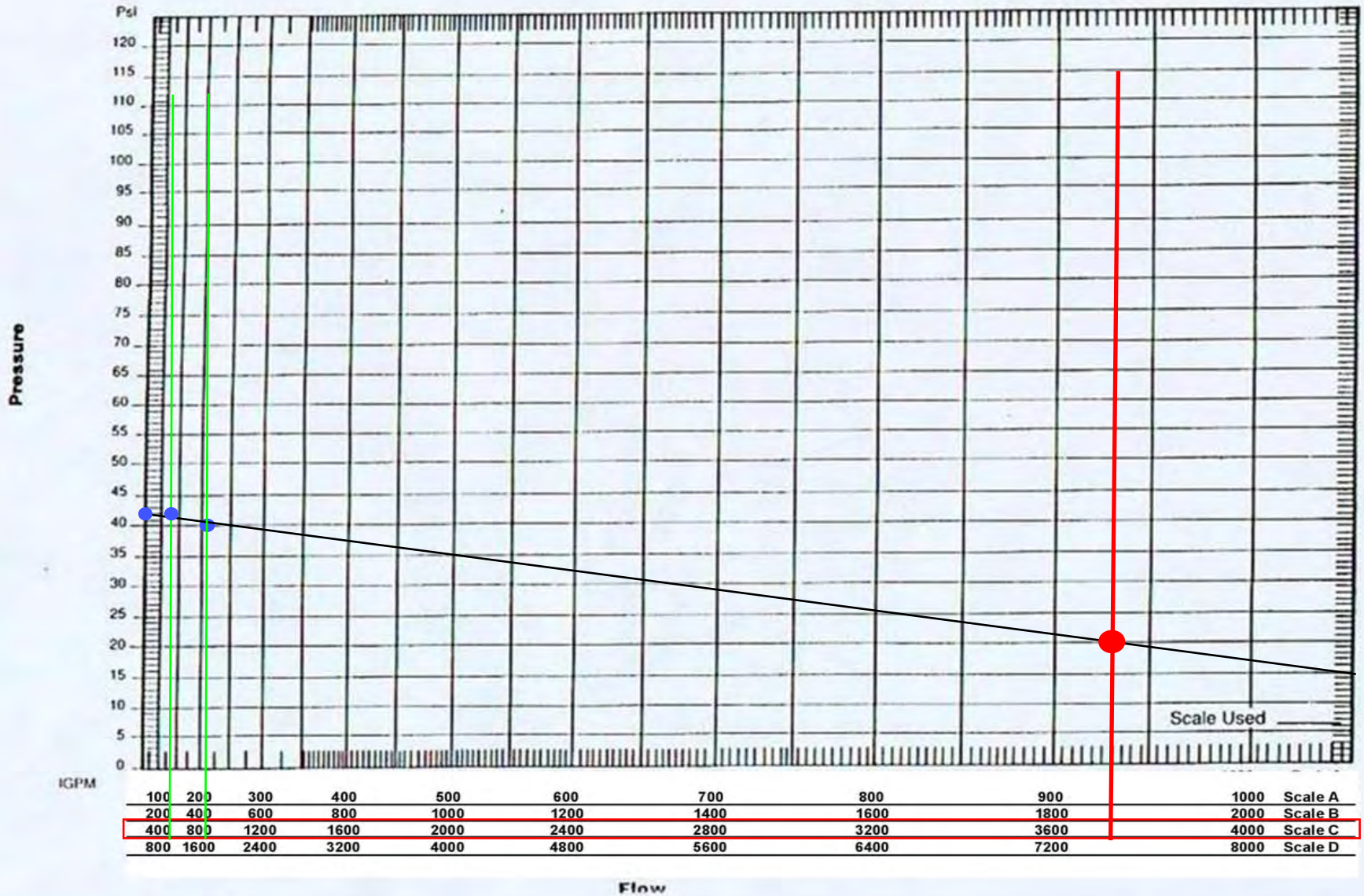
Hydrant flow information from the files of the Aqua Data Atlantic, regardless of their original source, are maintained for internal use only. Although such information is often shared with others, people or firms who make use of this data do so at their own risk.

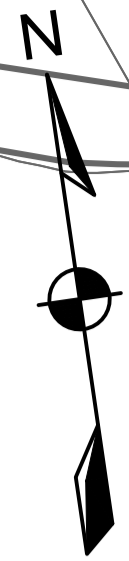




# Water Flow Test Summary

Location Kempt St Municipality Lunenburg, NS Date Nov 21, 2023





BACK HARBOUR

Area	Total Area (ha)	Res Units @ 3.35 ppu	Res Units @ 2.25 ppu	Population	Peak Commercial (L/s)	Notes
E1	1.56	13	0	44	0.00	Existing Area 1
E2	6.61	90	0	302	0.00	Existing Area 2
E3	6.91	44	25	204	0.00	Existing Area 3
D1a	9.16	368	0	1233	0.00	Development Option 1
D1b	9.16	256	0	858	0.00	Development Option 2
D1c	9.16	170	0	570	0.00	Development Option 3
PreUP1	9.16	71	0	238	0.00	Allowable Pre Upgrade Theoretical 15 L/s
PreUP2	9.16	137	0	459	0.00	Allowable Pre Upgrade Theoretical 18.9 L/s

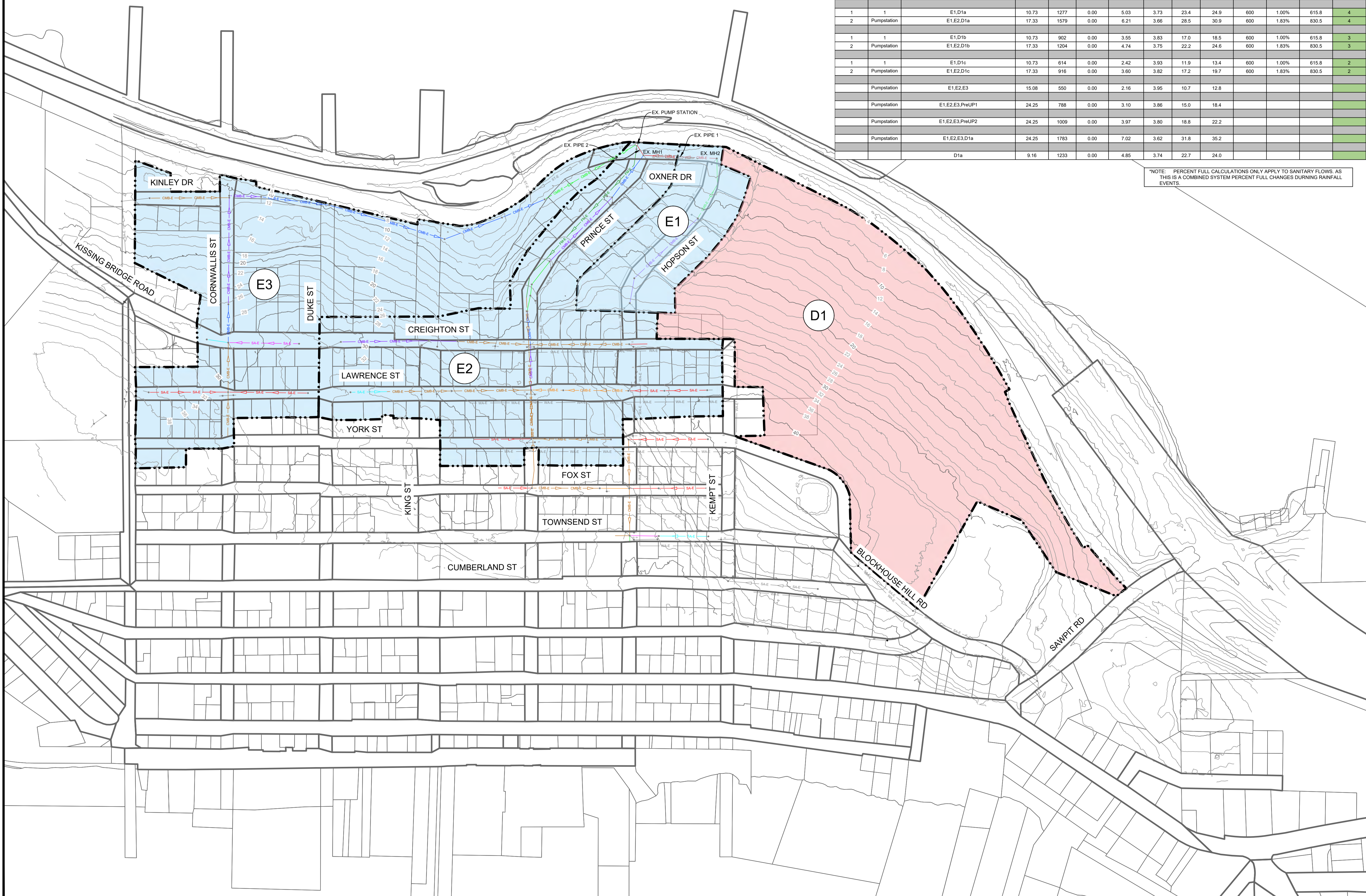
LEGEND

- PROPOSED DEVELOPMENT
- EXISTING DEVELOPMENT

- EX. 150 mm SANITARY PIPE
- EX. 200 mm SANITARY PIPE
- EX. 250 mm SANITARY PIPE
- EX. 150 mm COMBINED PIPE
- EX. 200 mm COMBINED PIPE
- EX. 250 mm COMBINED PIPE
- EX. 300 mm COMBINED PIPE
- EX. 375 mm COMBINED PIPE
- EX. 600 mm COMBINED PIPE
- EX. 150 mm FORCE MAIN
- SEWERSHED BOUNDARY

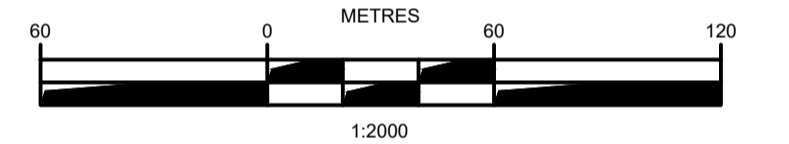
URS MH	DIS MH	TRIBUTARY AREAS	Total Area (ha)	Tot. Pop. ppu	Peak Commercial Load (L/s)	Average Dry Weather (L/s)	Harmon Peaking Factor	Peak Dry Weather Inst. SF (L/s)	Peak Wet Weather (L/s)	Pipe Size (mm)	Pipe Slope (%)	Pipe Capacity (L/s)	Percent Full (%)
1	1	E1	1.56	44	0.00	0.17	4.33	0.9	1.2	600	1.00%	615.8	0
2	Pumpstation	E1,E2	8.17	346	0.00	1.36	4.05	6.9	8.0	600	1.83%	830.5	1
1	1	E1,D1a	10.73	1277	0.00	5.03	3.73	23.4	24.9	600	1.00%	615.8	4
2	Pumpstation	E1,E2,D1a	17.33	1579	0.00	6.21	3.66	28.5	30.9	600	1.83%	830.5	4
1	1	E1,D1b	10.73	902	0.00	3.55	3.83	17.0	18.5	600	1.00%	615.8	3
2	Pumpstation	E1,E2,D1b	17.33	1204	0.00	4.74	3.75	22.2	24.6	600	1.83%	830.5	3
1	1	E1,D1c	10.73	614	0.00	2.42	3.93	11.9	13.4	600	1.00%	615.8	2
2	Pumpstation	E1,E2,D1c	17.33	916	0.00	3.60	3.82	17.2	19.7	600	1.83%	830.5	2
	Pumpstation	E1,E2,E3	15.08	550	0.00	2.16	3.95	10.7	12.8				
	Pumpstation	E1,E2,E3,PreUP1	24.25	788	0.00	3.10	3.86	15.0	18.4				
	Pumpstation	E1,E2,E3,PreUP2	24.25	1009	0.00	3.97	3.80	18.8	22.2				
	Pumpstation	E1,E2,E3,D1a	24.25	1783	0.00	7.02	3.62	31.8	35.2				
		D1a	9.16	1233	0.00	4.85	3.74	22.7	24.0				

\*NOTE: PERCENT FULL CALCULATIONS ONLY APPLY TO SANITARY FLOWS. AS THIS IS A COMBINED SYSTEM PERCENT FULL CHANGES DURING RAINFALL EVENTS.



SUBCATCHMENT ID **A1**

CONTOURS ARE BASED ON PROVINCIAL LIDAR ELEVATION DATA CONTOUR INTERVAL = 2 m



1	JAN. 15, 2024	ISSUED FOR REVIEW
ISSUE	DATE	DESCRIPTION
		CONSULTANT

**DESIGNPOINT**  
engineering • surveying • solutions

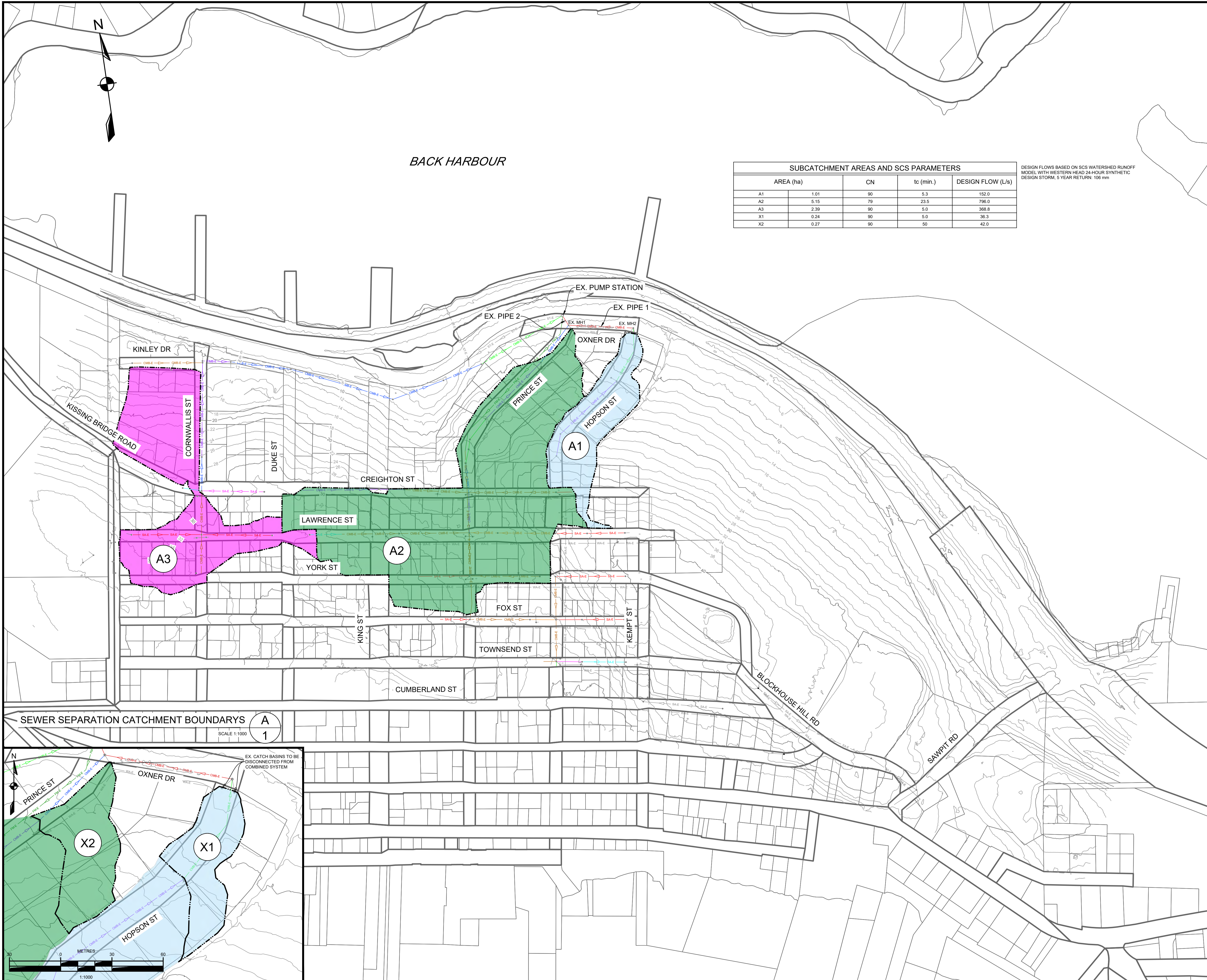
902.832.5597 designpoint.ca

CLIENT  
**MACKAY-LYONS SWEETAPPLE ARCHITECTS LIMITED**

PROJECT DESCRIPTION  
**BLOCKHOUSE HILL DEVELOPEMENT**  
LUNENBURG, NOVA SCOTIA  
SHEET DESCRIPTION

**DOWNSTREAM WASTEWATER CAPACITY ANALYSIS**

Drawn J. GALLANT	Engineer L. KING	Project No. 23-435	Drawing No. <b>C-SA01</b>
Scale 1:2000	Filename 23-435_EX_SA.dwg		1 of 2



BACK HARBOUR

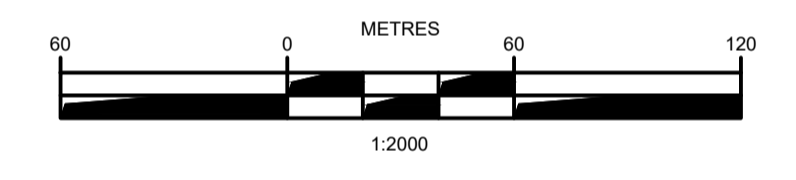
SUBCATCHMENT AREAS AND SCS PARAMETERS				
AREA (ha)	CN	tc (min.)	DESIGN FLOW (L/s)	
A1	1.01	90	5.3	152.0
A2	5.15	79	23.5	796.0
A3	2.39	90	5.0	368.8
X1	0.24	90	5.0	36.3
X2	0.27	90	90	42.0

DESIGN FLOWS BASED ON SCS WATERSHED RUNOFF MODEL WITH WESTERN HEAD 24-HOUR SYNTHETIC DESIGN STORM, 5 YEAR RETURN: 106 mm

	EX. 150 mm SANITARY PIPE
	EX. 200 mm SANITARY PIPE
	EX. 250 mm SANITARY PIPE
	EX. 150 mm COMBINED PIPE
	EX. 200 mm COMBINED PIPE
	EX. 250 mm COMBINED PIPE
	EX. 300 mm COMBINED PIPE
	EX. 375 mm COMBINED PIPE
	EX. 600 mm COMBINED PIPE
	EX. 150 mm FORCE MAIN
	CATCHMENT BOUNDARY

SUBCATCHMENT ID **A1**

CONTOURS ARE BASED ON PROVINCIAL LIDAR ELEVATION DATA CONTOUR INTERVAL = 2 m



1	JAN. 15, 2024	ISSUED FOR REVIEW
ISSUE	DATE	DESCRIPTION
CONSULTANT		

**DESIGNPOINT**  
engineering • surveying • solutions  
902.832.5597 designpoint.ca

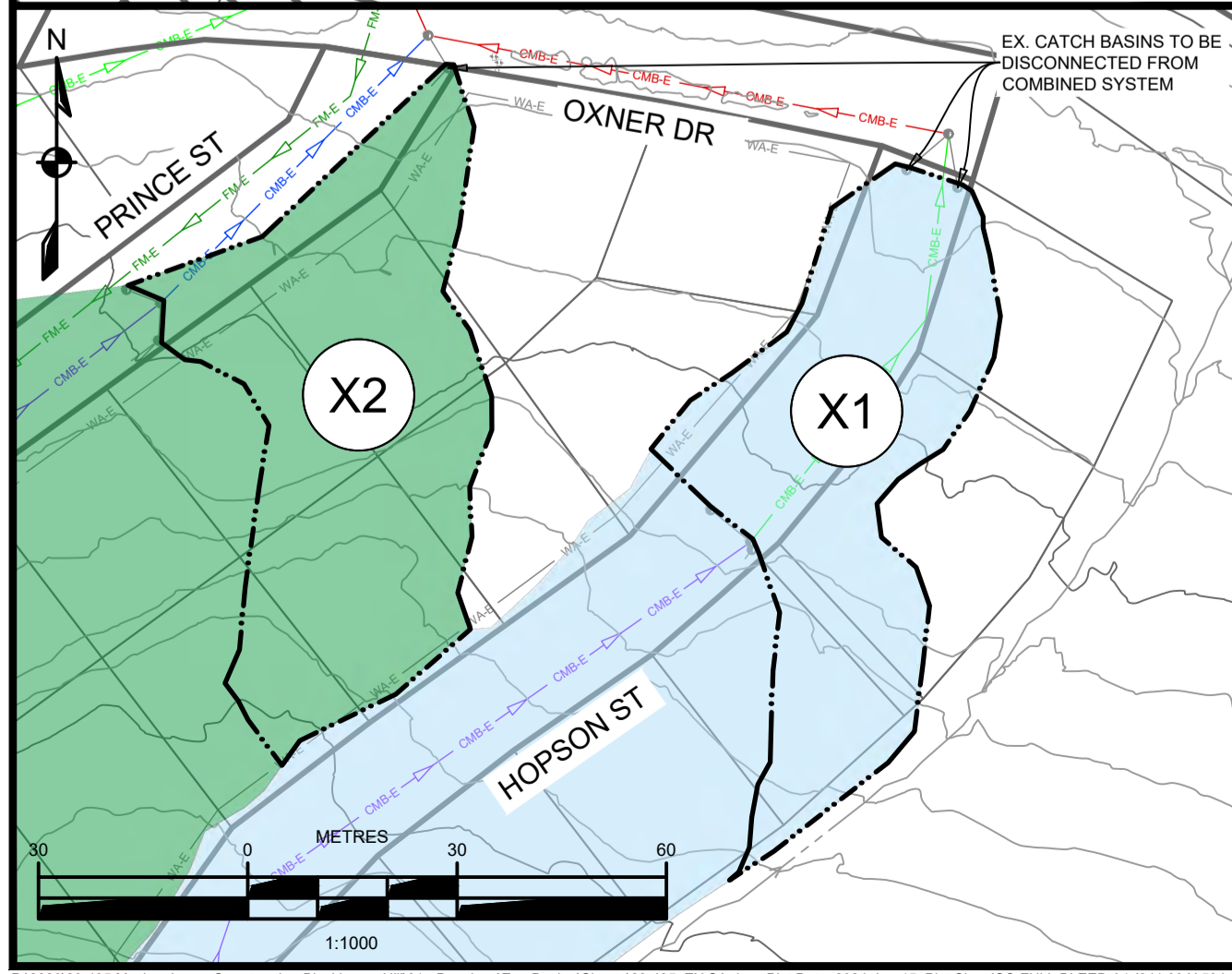
CLIENT  
**MACKAY-LYONS SWEETAPPLE ARCHITECTS LIMITED**

PROJECT DESCRIPTION  
**BLOCKHOUSE HILL DEVELOPEMENT**  
LUNENBURG, NOVA SCOTIA  
SHEET DESCRIPTION

**DOWNSTREAM WASTEWATER CAPACITY ANALYSIS - STORM CATCHMENTS**

Drawn J. GALLANT	Engineer L. KING	Project No. 23-435	Drawing No. <b>C-ST01</b>
Scale 1:2000	Filename 23-435_EX_SA.dwg	2 of 2	

SEWER SEPARATION CATCHMENT BOUNDARIES **A**  
SCALE 1:1000 **1**



P:\2023\23-435 Mackay-Lyons Sweetapple - Blockhouse Hill\01 - Drawings\Eng Design\Sheets\23-435\_EX\_SA.dwg, Plot Date: 2024-Jan-15, Plot Size: ISO FULL BLEED A1 (841.00 X 594.00 MM)

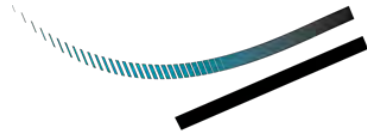




# APPENDIX C

WATER + WASTE WATER TREATMENT PLANTS IMPACT REPORT

DILLON CONSULTING



**DILLON**  
CONSULTING

MACKAY-LYONS SWEET APPLE ARCHITECTS LIMITED

# **Blackhouse Hill Development Study**

Impact to Water and Wastewater Treatment Plants

January 2024 – 23-6178



January 15, 2024

Town of Lunenburg  
19 Cumberland St  
Lunenburg, NS  
B0J 2C0

Attention: Hilary Grant, Senior Planner/Heritage Officer  
Town of Lunenburg

***Town of Lunenburg, Water and Wastewater Capacity Review for the Blockhouse Hill Development Project***

Dillon Consulting Limited (Dillon) is pleased to provide the Draft report on our assessment of the Lunenburg water and wastewater treatment plants. The assessment focussed on the ability of the treatment plants to service the increased population for the current growth rate compared to development options previously identified and those being developed Blockhouse Hill Development Options Project.

Should current natural growth continue the WTP and new WWTP (currently in design) may be suitable for the current expected design lives of the plant (15 and 25 years respectively). However, should the population growth increase due to the availability of housing, the timeline expected before for the replacement or significant upgrade of the water and wastewater plants diminishes. This required timeline before replacement is highly dependent on the rate of new development.

As the WWTP is currently in design it is recommended that the rate of population increase over the design life the plant be discussed as the scale of the Blockhouse Hill Development option was not previously known. As well, options for the replacement of the WTP should be considered before significant development is approved.

Sincerely,

**DILLON CONSULTING LIMITED**

A handwritten signature in blue ink that reads "Kyle MacIntyre".

Kyle MacIntyre, P.Eng.  
Associate

KAM:vrt

Our file: 23-6178

137 Chain Lake Drive  
Suite 100  
Halifax  
Nova Scotia  
Canada  
B3S 1B3  
Telephone  
902.450.4000

# Table of Contents

<b>1.0</b>	<b>Introduction</b>	<b>1</b>
1.1	Population .....	1
<b>2.0</b>	<b>Water Treatment Plant (WTP)</b>	<b>3</b>
2.1	Background Documents .....	3
2.2	Approvals to Operate – Water Treatment Plant .....	3
2.2.1	Water Withdrawal .....	4
2.2.2	Water Quality .....	4
2.3	Future Water Demands .....	4
2.4	Equipment Capacity .....	6
2.5	Estimated Impacts from Development .....	7
<b>3.0</b>	<b>Wastewater Treatment Plant</b>	<b>9</b>
3.1	Background Documents .....	9
3.2	Approval to Operate .....	9
3.3	Influent Design Criteria .....	10
3.4	Wastewater Generation .....	10
3.5	Proposed Major Equipment Capacity .....	10
3.6	Estimated Impact of Development .....	11
<b>4.0</b>	<b>Summary and Recommendations</b>	<b>13</b>
	<b>Tables</b>	
	Table 1: Estimated Population Increase for Each Option .....	1
	Table 2: Timeline to Full Population Increase from Development .....	2
	Table 3: Water Withdrawal Limits and Withdrawals .....	4
	Table 4: Summary of Estimated Future Flows .....	5
	Table 5: WTP Equipment .....	6
	Table 6: WTP's ability to service BHH and other noted developments .....	8
	Table 7: CBCL WWTP Design Criteria .....	10
	Table 8. Wastewater flows .....	10

Table 9: Proposed Wastewater Equipment Treatment Capacity..... 11

Table 10: WTP ability to service BHH and other noted developments..... 12

Table 11. Plausible Increase in WWTP Construction Costs ..... 13

**Appendices**

---

- A Population Estimate
- B Future Withdrawal Rates
- C Water Treatment Plant Process Flow Diagram



## 1.0 Introduction

Dillon Consulting (Dillon) was engaged by MacKay-Lyons Sweetapple Architects Limited (MLS Architects) as part of the Blockhouse Hill Development (BHH) Plan for the Town of Lunenburg (the Town). Dillon's scope of work was to assess the current water and wastewater treatment plant capacity to identify upgrades that may (eventually or immediately) be required to service development that is being considered by Council on BHH. It should be noted that Dillon was not provided an opportunity to visit the water treatment plant. The wastewater treatment plant is also currently undergoing the detailed design of a new facility as such the current facility was not evaluated.

Given the significant public interest in the project and the long-term investments that utilities make in constructing and maintaining water infrastructure, this report is intended to aid in decision-making and financial planning should the development proceed.

### 1.1 Population

Based on the information provided by MLS Architects, three different development options and population densities are expected depending on the Town's final decision; the fourth option, "Status Quo/Park", was not evaluated as there would be no population increase (and thus no water/wastewater impact). As part of the project, various density options were evaluated for the number of bedrooms and size of units, which is then used to estimate water/wastewater servicing demand. The following population densities have been assumed for each type of housing:

- Studio – 2 people
- 1 bedroom – 2 people
- 2 bedroom – 3 people
- 3 bedroom – 4 people

Based on these densities, **Table 1** summarizes the expected population increase of each option at full build-out. For a full breakdown of the unit types and additional detail please refer to MLS Architect's report.

**Table 1: Estimated Population Increase for Each Option**

Option	Units	Population
OPTION 1: TOWN SQUARE	368	956
OPTION 2: OUT OF SIGHT	256	742
OPTION 3: COMMONS CRESCENT	170	506

Previous reports (*Pre-Design WWTP and Water & Sanitary/Storm System Development Masterplan*) by CBCL Limited had included estimates on a potential BHH population to understand design considerations for water and wastewater distribution/collection systems. CBCL had estimated future developments of 1,100 people for the Town but did not indicate the timeline that the population increase would occur. This estimate of future development also included BHH development of approximately 298 people.

To determine the population growth in Lunenburg, Dillon used the values for other developments from CBCL (802 people), and the BHH population was replaced with the options presented above.

With the natural growth of the community in addition to BHH and the unknown timeline for development, it has been assumed that all development will be based on housing needs from general population growth and there would be no instantaneous increase in population with the development.

The Government of Nova Scotia Finance and Treasury Board's 2023 housing report estimated a population increase in Lunenburg of 6% between 2022 and 2027 (1.17% annually). Assuming other planned developments indicated in this report remain the same and are constructed in a similar time frame to BHH, the planned future developments by Lunenburg are summarized in Table 2 and Lunenburg population as of 2022 in the Housing Report (2,440 people). There is a risk that the build-out of these developments, specifically BHH may attract more individuals to the area thus increasing the rate of population growth however it is possible at the time of the development of this report to understand the timeline and scale of development nor the interest around moving to the region.

**Table 2: Timeline to Full Population Increase from Development**

Option	Added Population	Total Population	Estimated Year*
OPTION 1: TOWN SQUARE	1,708	4,148	2068
OPTION 2: OUT OF SIGHT	1,518	3,758	2060
OPTION 3: COMMONS CRESCENT	1,305	3,745	2059

Note:

\*Assumes current growth rate of 1.17% per year is maintained.

A summary of the yearly growth is provided in **Appendix A**.

Typically, water and wastewater treatment plants are designed for a minimum 20-25 year design basis. As the expected development build-out population is outside this typical treatment equipment life cycle, the subsequent section will look at the expected lifespan of equipment capacities based on this 1.17% rate of growth though other upgrades could be required due to operational conditions.

## 2.0 Water Treatment Plant (WTP)

The Lunenburg WTP is a membrane filtration plant originally constructed in 2010 with a Pumpouse located on Dares Lake along with a WTP and storage tank on Northwest Raod. Water is extracted by the pumphouse and put through a fine screen before being pumped to the WTP. The screened water is then injected with soda ash to regulate pH and polyaluminium chloride (PAC) is added to aid in flocculation. This is achieved via a flash mix chamber before entering one of two floc tanks. After flocculation, the partially treated water moves to a pressurized membrane filtration, consisting of 4 skids. Filtered water is then chlorinated and stored in a reservoir connected to the distribution system. In 2023 the plant underwent an upgrade to increase the size of the membrane filtration skid and increase water production.

### 2.1 Background Documents

Dillon completed a review of relevant background information to gain a better understanding of the conditions and issues prior to the site visit. Information reviewed included:

- Background Report and Studies:
  - Approval for Operation – 2010-071794-02
  - Approval for Withdrawal – 2011-079411-01
  - CBCL 2023 Water System Assessment Report – Lunenburg Water Treatment Plant
  - CBCL 2010 Control Narrative & System Integration Summary
  - Town of Lunenburg Municipal Drinking Water Supplies Annual Report 2022
  - CBCL 2023 Water Distribution System Assessment

Due to the Town staff availability, Dillon was not able to visit the WTP, as such the information was summarized from available reports along with input from operations staff regarding the recent upgrade the UF system.

### 2.2 Approvals to Operate – Water Treatment Plant

The Lunenburg WTP operates under Approval to Operate No. 2010-071794-02 issued by Nova Scotia Environment, expiring in June 2029, and under Approval to Withdrawal 2011-079411-01, expiring in July 2032.

### 2.2.1 Water Withdrawal

**Table 3** below compares the approval limits to the actual water withdrawal rate for the Town based on the 2022 data. The water withdrawals have remained below the maximum withdrawal amount stated in the approval.

**Table 3: Water Withdrawal Limits and Withdrawals**

Parameter	Approval Limit (m <sup>3</sup> /day)	Maximum Withdrawal Per Time Period (m <sup>3</sup> /day)
Average Daily Withdrawal Volume (Averaged over 30 days, per approval)	3,600	3,217
Maximum Withdrawal (Averaged over 3 day per approval)	5,114	3,509

### 2.2.2 Water Quality

The Approval to Operate requires the following conditions to be met:

- Maximum Turbidity from membrane filtration of 0.1 NTU for 99% of the time
- Maximum Turbidity from membrane filtration of 0.3 NTU never exceeded
- Chlorine residual throughout the system to be 0.20 mg/L free chlorine and not to exceed 4.0 mg/L free chlorine.

Based on the information provided for 2022, the membranes have been able to meet the maximum of 0.1 NTU 99% of the time. The maximum allowed turbidity of 0.3 NTU was exceeded several times in 2022, however, every exceedance occurred during maintenance procedures where the turbidimeters were not put on a 'Hold' status. The disinfectant residual for 2022 was above the 0.20 mg/L minimum and below the 4.0 mg/L maximum for free chlorine for all sampling tests during the year.

When raw and treated water chemistry was compared to the GCDWQ in 2020 as part of the System Assessment report, these were parameters found to not be in compliance. These were chloride (in both the raw and treated water samples), with manganese and pH exceeding in the raw water samples.

### 2.3 Future Water Demands

From the CBCL 2023 report, which summarized water demands from 2018 – 2021, the community uses an estimated 614 L/cap/day of water. This value includes industrial users such as High Liner Foods, which accounts for approximately 25% of the water use in the community, however, the residential and industrial uses were not broken out. The estimated water use from the *Atlantic Canada Water Supply Guidelines* is typically 270 to 450 L/cap/day, and where exact domestic flows are not available 350 L/cap/day can be used. Based on this variability in water demands two methods were used to understand the future water demands of the community.

1. Assuming industrial water demand is proportional to population growth.
2. Assuming industrial water demand remains constant, regardless of population growth.

Option 1 considers a sustained high water demand with consistent population growth, while Option 2 considers a large portion of the population growth within Lunenburg noted in the Government of Nova Scotia Housing Report were identified a seniors who are less likely to participate in industrial development. The likelihood of industrial water demand increasing consistently with population growth is unlikely without new industries (requiring process water) entering Lunenburg.

For Option 1 the industrial flow was converted to a population equivalent value and the 614 L/cap per day was applied with 1.17% annual population increase. Peaking factors of the current operational data were used to determine Maximum day Demand (MDD) and Peak Hourly Demand (PHD), 1.38 and 1.66 respectively which are lower than the Atlantic Canada Guidelines design recommendation.

For Option 2, the industrial flow rate was subtracted from the water volume assumed to be used by the general public of 350L/cap/ day to determine the theoretical domestic Average day demand (ADD). ACWWA Water Supply Guidelines, 2022 factors for MDD and PHD of 2.5 and 3.38 respectively were used for population values below 3,000 people and 2.00 and 3.00 when populations were larger than 3000 people. The peaking factors are reduced with increased population since there is an evening of flows throughout the day with increased populations.

These two options provide a high (Option 1) and Low (Option 2) range water demand scenario for the community. In addition to the system demands, the WTP system requires water to perform regular maintenance activities. This can change over time and is known to increase with the age of the equipment. For this high-level planning exercise, a conservative 15% backwash value was applied to calculate the total withdrawal requirements of the system.

A detailed review of projected water demand values are provided in **Appendix B** with a summary in **Table 4** below.

**Table 4: Summary of Estimated Future Flows**

	ADD (m <sup>3</sup> /d)	MDD (m <sup>3</sup> /d)
Withdrawal Approval Limit	3,600	5,114
Estimated 15-year outlook, 2039 (Population of 2975 people)		
Option 1	3,630	5,010
Option 2	3,176	4,618
Estimated 25-year outlook 2049 (Population of 3342 people)		
Option 1	4,080	5,630
Option 2	3,270	4,540

	ADD (m <sup>3</sup> /d)	MDD (m <sup>3</sup> /d)
Estimated Timeline to Exceeding Current Withdrawal Permit		
Option 1	2039 (Population of 2,975 people)	2041 (Population of 3,045 people)
Option 2	2071 (Population of 4,170 people)	2069 (population of 4,219 people)

Due to the long-term nature of Water Withdrawal permit, no action is required currently. However, permit increases can often take 1-2 years of planning to approve, and should be re-evaluated annually to confirm the water demands of the community and changes to population demographic factors can be provided by the current withdrawal limits. The estimated Town's populations should be compared to development approval as the estimated year of exceedance to the water withdrawal may be impacted.

## 2.4 Equipment Capacity

Dillon has outlined the capacity of the key existing equipment based on the documentation provided by the Town. A general process flow diagram is provided in **Appendix C** to illustrate the overall treatment process. **Table 5** below summarises the rated capabilities noted by operations staff or as part of the noted background documentation. Dillon was not provided access to review the WTP.

**Table 5: WTP Equipment**

Equipment	Quantity	Configuration	Details	Size
Soda Ash dosing pumps	3	Lead/Lag/Standby	ProMinant Sigma	18.4 L/hr (69.7 gph)
Coagulet dosing pumps	1	-	prominent Delta	29.2 L/hr (7.71 gph)
MF Membrane Units	4	Duty (3)/ Standby (1)	Pall Aria AP Water Treatment System* upgraded	5,961 m3/day
Primary Chlorinators	2	Duty/Standby	Wallace & Tieman V10K V-Notch Chlorinator	15 kg/hr
Secondary Chlorinators	2	Normal/Fire Flow	Wallace & Tieman V10K V-Notch Chlorinator	15 kg/hr

Equipment	Quantity	Configuration	Details	Size
Contact Tank	1	Duty	Contact Camber Volume: 465.4 m <sup>3</sup> Baffling Factor: 0.7 Cl <sub>2</sub> residual: 1 mg/L CT required: 51 mg*min/L min for Virus	Max flow: 9,189 m <sup>3</sup> /day
Clear Well	1	Duty	Diameter: 29 m Min Depth: 5.10 m	3,425 m <sup>3</sup>

Current proposals are being put forward at the time of this report to upgrade the piping and pumping system to the UF Membranes allowing the equipment to operate effectively at this higher flow rate. Assuming this moves forward the overall rate capabilities of the WTP would be 5,961 m<sup>3</sup>/day with one train out of service. This rate is higher than the withdrawal rate of the WTP and does not consider the water required for backwash and general operation. Using the previous assumption that 15% water is used for backwash and operation the production of the WTP for distribution would be 5,067 m<sup>3</sup>/day.

It should be noted that the treatment equipment will now be capable of exceeding the maximum withdrawal limit outlined in section 2.3 above. As such the approval to withdrawal will need to be expanded. If this does not occur the maximum withdrawal of 5,114 m<sup>3</sup>/day is expected to be exceeded when the population reaches 2,975 people (with proportional industrial growth).

## 2.5 Estimated Impacts from Development

WTP was recently upgraded to a rated capacity of total capacity of 5,961 m<sup>3</sup>/day and assumed distribution capabilities of 5,067 m<sup>3</sup>/day with one train out of service. At the current population increase of 1.17% this would allow for the WTP to be serviceable to the community until the population reaches of 2,975 under Option 1 (Proportional Industrial Growth) and 3,899 under Option 2 (no industrial growth). As such it would be recommended that the WTP be considered for a significant upgrade to increase the capacity to a 25-year design horizon when the population approaches 2,975. The current water demand should be monitored and confirmed as this is dependent on the industrial water demand rate. At the time of this report, it is estimated this will be in 2039, in line with the expected longevity of the WTP according to comments by operations staff.

**Table 6** below summarizes the WTP's ability to meet the demands of the future estimated populations with the proposed BHH Development options including the other identified development in the community with proportional or no industrial growth.

**Table 6: WTP's ability to service BHH and other noted developments**

<b>Option</b>	<b>Total Population</b>	<b>Option 1: Proportional Industrial Growth</b>	<b>Option 2: No Industrial growth</b>
OPTION 1: TOWN SQUARE	4,148	No	No
OPTION 2: OUT OF SIGHT	3,758	No	Yes
OPTION 3: COMMONS CRESCENT	3,745	No	Yes

If the expected development timeline will increase the population of Lunenburg above 2,975 people before the year 2039 adjustments should be made to consider major upgrades or a new WTP before this occurs.

It is expected that an increase to the Water Withdrawal Permit from 5,114 to 5,961 m<sup>3</sup>/day will be needed in the next 10-15 years to meet the maximum day demand and allow for full operation of the WTP capabilities regardless of development and the rate of approved development be compared the maximum output of the WTP.

## 3.0 Wastewater Treatment Plant

The Lunenburg WWTP is currently undergoing major upgrades. A design basis has been developed and a RFP was recently awarded for detailed design. The designers have allowed for a modest population increase but this was completed prior to the BHH development study. This assessment aims to understand the implication of development on the proposed upgrade.

The current WWTP uses the moving bed biofilm reactor (MBBR) treatment process with downstream dissolved air flotation (DAF) clarification and Ultraviolet (UV) disinfection. Based on available design documents, the upgraded WWTP will be a Sequenced Batch Reactor (SBR) treatment system. As the proposed WWTP upgrade is expected to be complete in the short term before any potential new units are built at BHH, our assessment focuses on the new equipment rather than the existing infrastructure that will be decommissioned in the coming years.

### 3.1 Background Documents

Dillon completed a review of relevant background information to gain a better understanding of the conditions and issues prior to the site visit. Information reviewed included:

- Background Report and Studies:
  - Approval for Operation – 2012-082710-03
  - Town of Lunenburg Wastewater Treatment Plant Annual Report 2022
  - CBCL 2022 Wastewater Treatment Plant Pre-design Draft Report

### 3.2 Approval to Operate

The Lunenburg Wastewater Treatment plant operates under Approval to Operate No. 2012-082710-03 and expires March 19, 2033. The system is governed by the quality of the effluent discharged after treatment, including:

- cBOD5 (shall not exceed 20 mg/L);
- Total Suspended Solids (shall not exceed 20mg/L);
- E. Coli (shall not exceed 1000/100 count E. coli/100mL); and
- pH (shall be within the range of 6.0 to 9.0).

Lunenburg's WWTP effluent is analyzed weekly by an accredited laboratory and averaged quarterly. These results are taken from the effluent discharge point. There were some noted exceedances in the latest Annual report (2022). However, these were accounted for due to specific situations, not the general operation of the WWTP, such as emergency or upset conditions coming from overflows and flooding from rainfall events, power failures at lift stations and emergency repairs to force mains.

### 3.3 Influent Design Criteria

Sampling was previously collected and summarized for the creation of the WWTP Design Basis report by CBCL. **Table 7** below summarizes the proposed design criteria for the WWTP upgrade, which was compared to literature values from Metcalf & Eddy, Inc, 2003 and ACWGM. There is some variation due to rounding in the loading rates however these appear appropriate based on the information presented.

**Table 7: CBCL WWTP Design Criteria**

Parameters	Literature Value (kg/cap/day)	Design Average (kg/cap/day)	Design peak (kg/cap/day)
CBOD	0.08 kg/cap/day	0.07	0.13
TSS	0.09 kg/cap/day	0.11	0.256
TKN	0.013 kg/cap/day	0.011	0.026

### 3.4 Wastewater Generation

CBCL conducted a pre-design study in April 2022 to develop the Design Basis for a new wastewater treatment plant. As part of this report sampling was conducted and assumed a design population of 3,360 based on the previously discussed planned development of 1,100 people. They recommended an average daily flow of 2,900 m<sup>3</sup>/day and 11,400 m<sup>3</sup>/day peak. **Table 8** below summarizes the measured and design flows per capita. CBCL has assumed that there will be continued work to separate the combined sewer thus reducing total wastewater flows to the WWTP. With the increased population in new developments, the flow per capita would also decrease as a higher portion of the system flows would be part of new systems that could be designed with separated sewers. As this is the existing flow through the system, it is assumed that the industrial wastewater production is proportional to the current operation. As such, no significant industrial uses are added to the wastewater treatment system. Should the sewer separation project recommended by CBCL not occur it is likely to reduce the lifespan of the WWTP.

**Table 8. Wastewater flows**

	Current flows	Recommended design flows
Wastewater production rate	1.287 m <sup>3</sup> /cap/day	0.86 m <sup>3</sup> /cap/day
Population capacity (ADF 2,900 m <sup>3</sup> /day)	2,253 people	3,600 people

### 3.5 Proposed Major Equipment Capacity

The equipment capacities listed below are based on the information provided by the CBCL Wastewater Treatment Plant Pre-Design report (2022). Based on the information available in this report a summary of the proposed equipment sizes is presented in **Table 9**.

It is assumed that equipment similar to those noted are planned to be part of the detailed design of the WWTP and are designed for the flows outlined in the table below. It is also assumed that the wastewater treatment would provide sufficient ability for solids handling.

**Table 9: Proposed Wastewater Equipment Treatment Capacity**

Equipment	Quantity	Configuration	Average	Capacity
Fine Screen	1	Duty	2,900 m <sup>3</sup> /d	11,400 m <sup>3</sup> /d
Aerated Grit Removal Chamber	2	Duty	2,900 m <sup>3</sup> /d	11,400 m <sup>3</sup> /d
Sequence Batch Reactors influent	2	Duty	2,900 m <sup>3</sup> /d	11,400 m <sup>3</sup> /d
Equalization Tank	1	Duty	2,900 m <sup>3</sup> /d	11,400 m <sup>3</sup> /d
Sequence Batch Reactor Blower	2	Duty	N/A	1,255 m <sup>3</sup> /hr
Effluent Lift Station Pumps	2	Duty/Standby	N/A	12,537 m <sup>3</sup> /day
Ultraviolet Disinfection Chamber	2	Duty/Standby	2,900 m <sup>3</sup> /d	11,400 m <sup>3</sup> /d
Equalization Tank	1	Duty	2,900 m <sup>3</sup> /d	11,400 m <sup>3</sup> /d

### 3.6 Estimated Impact of Development

Based on the pre-design report equipment sizing and plant design are based on the design population of 3,360. This population is estimated to be reached in 2050 based on the estimated population increases of 1.17% annually and maintaining industrial connections/ wastewater production. An option to not include industrial development was not explored for the WWTP option as no information was provided or available of specific industrial suppliers.

Should the Town not proceed with the recommended separation of sanitary and storm sewer as noted in the CBCL Wastewater pre-design report (including new developments such as BHH) the average hydraulic loading of the plant would not be in current production. It is therefore recommended that the Town implement the recommended changes to the sanitary sewer and monitor flow at various places in the collection system in conjunction with the construction of the new WWTP. Should this not occur the proposed design would not meet the current needs of the Town. **Table 10** below summarizes the design population of the new WWTP compared to the current and total community populations for each of the development options.

As the estimated demand from a BHH development has increased since that design basis was developed (previously estimated to be 298 people), and the Town should review if the capacity should be increased, or if the BHH development would limit potential growth in the community elsewhere and confirm the timeline for the development.

**Table 10: WTP ability to service BHH and other noted developments**

<b>Option</b>	<b>Total Population</b>
Estimated 2024 Population	2,400
Design population of the new WWTP	3,600
BBH OPTION 1: TOWN SQUARE	4,148
BBH OPTION 2: OUT OF SIGHT	3,758
BBH OPTION 3: COMMONS CRESCENT	3,745

Dillon noted that no considerations were made in the design report to the sizing and location of the effluent outfall. It is recommended the size of this pipe and discharge location be considered as the increased flows will have an impact on the mixing and dilution in the discharge environment.

## 4.0

## Summary and Recommendations

Based on current project schedules, servicing demand from BHH will not be realized until the wastewater treatment expansion is complete; the Town also recently completed a smaller expansion of its water treatment plant and is still working to generate full operation.

It is recommended that the Town of Lunenburg in the selection of an option for the development of BHH to determine the timeline for development in the community. Should the development meet the current demand rate of 1.17% annually based on the Nova Scotia Housing Report the design life of the WTP is expected to see its expected useful life requiring a new or significantly upgraded WTP in 2039. The design of the new WWTP appears to be designed for an expected 25-year lifespan (2050, assuming commissioning in 2025) which is in line with the standard design horizon for the WTP.

Should the population growth rate be greater in Lunenburg due to the availability of housing at BHH and other developments the timeline for the expected lift of the treatment infrastructure will be reduced.

If the timeline for future developments is provided to the team designing the new WWTP, consideration may be possible to consider a higher growth rate. Similarly, the WTP has recently undergone upgrades to increase capacity providing time to consider the longer-term needs of the community to expand or build a new WTP.

Overall, the cost for a new WWTP is borne by all users of that system, including existing customers and future growth. The new WWTP has included a general allowance for increases to the population over the design life, which would include the BHH area. The latest reference document provided indicated that the WWTP would have an ultimate design capacity of 3,360 residents, 298 of which would reside in BHH. Actual population forecasts for the various development scenarios indicate that this should be increased to 3,745 or 4,148 (depending on which development scenario is approved. This represents an increase of 11.5 to 23.5% compared to the overall design basis; if it is not possible to incorporate this at the project stage, the result is that population increases beyond the ~298 assumed for BHH would need to be at the expense of other developments within the Town. Based on a capital cost estimate of approximately \$25M for the new WWTP, the approximate increase due solely to BHH developments is shown in Table 11.

**Table 11. Plausible Increase in WWTP Construction Costs**

Options	Plausible increase in new WWTP construction costs
OPTION 1: TOWN SQUARE	\$5.863 Million (23.45 %)
OPTION 2: OUT OF SIGHT	\$2.963 Million (11.85%)
OPTION 3: COMMONS CRESCENT	\$2.875 Million (11.5 %)

The logistics and cost for water treatment plant were reviewed with operations staff. The timeline for a new WTP will be based on the actual development rate per year, however, based on historical growth trends it is expected to be needed between 10 and 15 years from now. Detailed design would be necessary to provide a firm budget estimate, but the order of magnitude is expected to be \$20M in 2023 dollars. Planning and design for large infrastructure projects often take several years, so it is recommended that the town monitor demand changes annually and plan for capital upgrades 3-5 years in advance where possible.

# Appendix A

## *Population Estimate*

**Population Estimate**

<b>Year</b>	<b>Population</b>
2023	2469
2024	2498
2025	2527
2026	2556
2027	2586
2028	2617
2029	2647
2030	2678
2031	2710
2032	2742
2033	2774
2034	2806
2035	2839
2036	2872
2037	2906
2038	2940
2039	2975
2040	3009
2041	3045
2042	3080
2043	3117
2044	3153
2045	3190
2046	3227
2047	3265
2048	3304
2049	3342
2050	3381
2051	3421
2052	3461
2053	3502
2054	3543
2055	3584
2056	3626
2057	3669
2058	3712
2059	3755
2060	3799
2061	3844
2062	3889
2063	3935
2064	3981
2065	4027
2066	4075
2067	4122
2068	4171

# Appendix B

## *Future Withdrawal Rates*

**Option 1**

Year	Population	Equivalent Population	Withdrawal	
			ADD (m <sup>3</sup> )	MDD (m <sup>3</sup> )
2022	2440	4218	2978.33	4110.10
2023	2469	4267	3013.24	4158.27
2024	2498	4317	3048.56	4207.02
2025	2527	4368	3084.30	4256.33
2026	2556	4419	3120.46	4306.23
2027	2586	4471	3157.03	4356.71
2028	2617	4523	3194.04	4407.78
2029	2647	4577	3231.48	4459.45
2030	2678	4630	3269.36	4511.72
2031	2710	4684	3307.69	4564.61
2032	2742	4739	3346.46	4618.12
2033	2774	4795	3385.69	4672.25
2034	2806	4851	3425.38	4727.02
2035	2839	4908	3465.53	4782.43
2036	2872	4966	3506.16	4838.49
2037	2906	5024	3547.26	4895.21
2038	2940	5083	3588.84	4952.60
2039	2975	5142	3630.91	5010.65
2040	3009	5202	3673.47	5069.39
2041	3045	5263	3716.53	5128.81
2042	3080	5325	3760.10	5188.93
2043	3117	5388	3804.17	5249.76
2044	3153	5451	3848.77	5311.30
2045	3190	5515	3893.88	5373.56
2046	3227	5579	3939.53	5436.55
2047	3265	5645	3985.71	5500.28
2048	3304	5711	4032.43	5564.75
2049	3342	5778	4079.70	5629.98
2050	3381	5846	4127.52	5695.98
2051	3421	5914	4175.91	5762.75
2052	3461	5983	4224.86	5830.30
2053	3502	6054	4274.38	5898.65
2054	3543	6124	4324.49	5967.79
2055	3584	6196	4375.18	6037.75
2056	3626	6269	4426.47	6108.53
2057	3669	6342	4478.36	6180.13
2058	3712	6417	4530.85	6252.58
2059	3755	6492	4583.96	6325.87
2060	3799	6568	4637.70	6400.02
2061	3844	6645	4692.06	6475.05
2062	3889	6723	4747.06	6550.95
2063	3935	6802	4802.71	6627.74
2064	3981	6881	4859.01	6705.43
2065	4027	6962	4915.97	6784.04
2066	4075	7044	4973.59	6863.56
2067	4122	7126	5031.90	6944.02
2068	4171	7210	5090.88	7025.42

**Option 2**

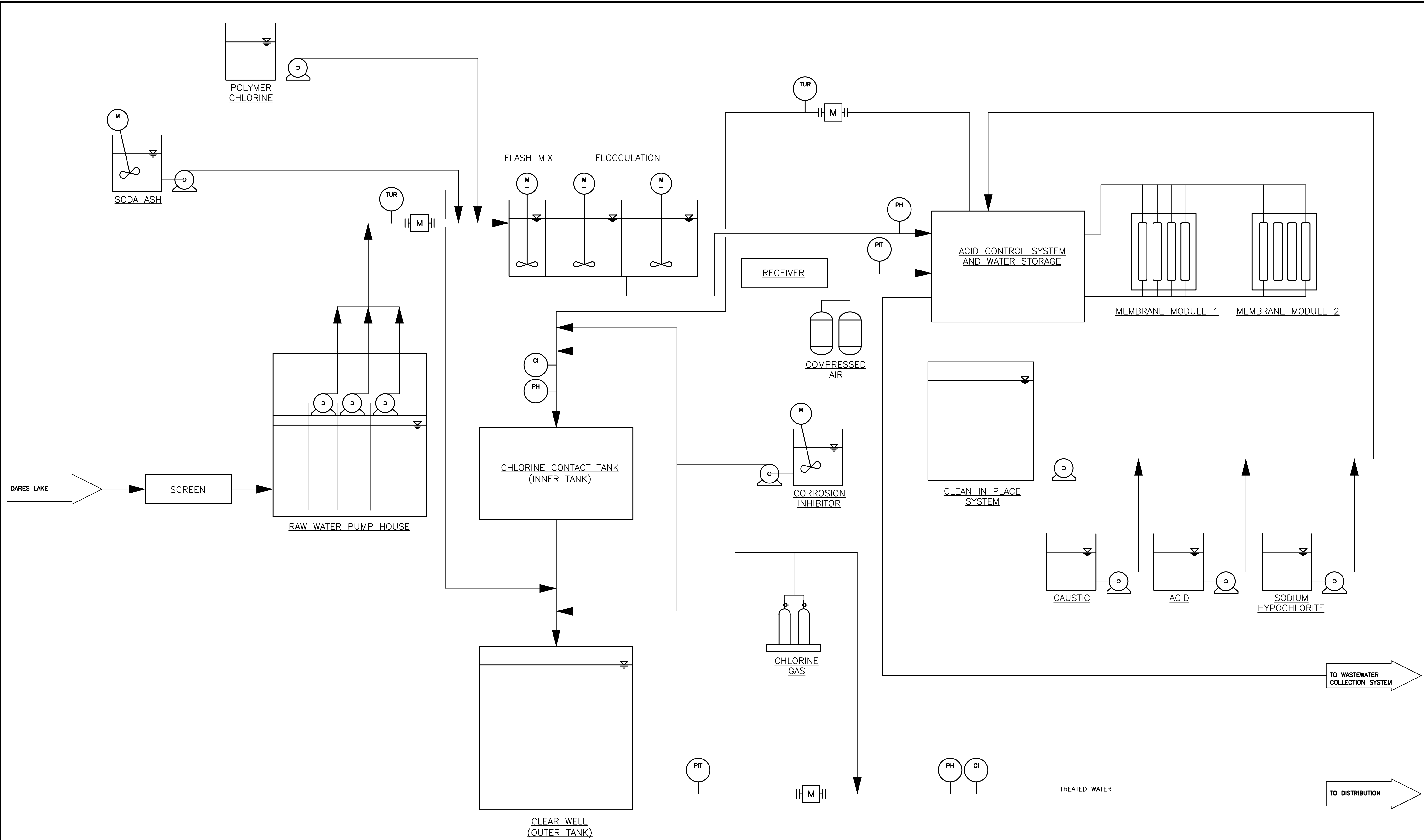
Year	Population	Withdrawal	
		ADD (m <sup>3</sup> )	MDD (m <sup>3</sup> )
2022	2440	2961.71	4133.85
2023	2469	2973.22	4159.75
2024	2498	2984.87	4185.96
2025	2527	2996.65	4212.47
2026	2556	3008.58	4239.30
2027	2586	3020.64	4266.43
2028	2617	3032.84	4293.89
2029	2647	3045.19	4321.67
2030	2678	3057.68	4349.78
2031	2710	3070.32	4378.21
2032	2742	3083.10	4406.98
2033	2774	3096.04	4436.08
2034	2806	3109.12	4465.53
2035	2839	3122.36	4495.32
2036	2872	3135.76	4525.46
2037	2906	3149.31	4555.95
2038	2940	3163.02	4586.80
2039	2975	3176.90	4618.02
2040	3009	3190.93	4346.76
2041	3045	3205.13	4375.16
2042	3080	3219.50	4403.90
2043	3117	3234.03	4432.96
2044	3153	3248.74	4462.37
2045	3190	3263.61	4492.13
2046	3227	3278.66	4522.23
2047	3265	3293.89	4552.69
2048	3304	3309.30	4583.50
2049	3342	3324.88	4614.67
2050	3381	3340.65	4646.21
2051	3421	3356.61	4678.12
2052	3461	3372.75	4710.40
2053	3502	3389.08	4743.07
2054	3543	3405.60	4776.11
2055	3584	3422.32	4809.54
2056	3626	3439.23	4843.37
2057	3669	3456.34	4877.59
2058	3712	3473.65	4912.21
2059	3755	3491.17	4947.23
2060	3799	3508.88	4982.67
2061	3844	3526.81	5018.52
2062	3889	3544.95	5054.80
2063	3935	3563.30	5091.50
2064	3981	3581.86	5128.63
2065	4027	3600.64	5166.19
2066	4075	3619.65	5204.19
2067	4122	3638.87	5242.64
2068	4171	3658.32	5281.54

## Appendix C

### *Water Treatment Plant Process Flow Diagram*

LONDON

FILENAME: C:\P\WORKING DIRECTORIES\PROJECTS\_2023\DILLON\_1000\DWG62817\236178-10-PRO-CON-DWG\_PLOT SCALE: 1:86.441 PLOT STYLE: DILLON-STANDARD.CTB



**Conditions of Use**  
 Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.  
 Do not scale dimensions from drawing.  
 Do not modify drawing, re-use it, or use it for purposes other than those intended at the time of its preparation without prior written permission from Dillon Consulting Limited.



DESIGN	CL	REVIEWED BY	KAM
DRAWN	CG	CHECKED BY	KAM
DATE	DECEMBER 2023		
SCALE	NTS		
No.	A	CLIENT REVIEW	2023-DEC-07 KAM
		ISSUED FOR	DATE BY

WWW TREATMENT PLANT REVIEW  
 LUNENBURG, NOVA SCOTIA

**WATER TREATMENT PLANT PROCESS  
 FLOW DIAGRAM**

PROJECT NO.  
23-6178

SHEET NO.  
**PFD1**





# APPENDIX D

DRAFT ARCHAEOLOGICAL RESOURCE IMPACT REPORT

DAVIS MACINTYRE + ASSOCIATES

## Attachment G – Land Profile Evaluation Tool

1. Specify the location and area of the land (i.e. civic address, PID #, survey)
  - PIDs 60056892, 60671427, 60056991, 60056900. See also the maps in Attachments A, B and C.
2. Specify the monetary value of the land (assessed/appraised value).
  - An appraisal is underway and may be discussed in camera at a later date.
3. What form of access is there to the property? (public road, private road, easement).
  - Public street frontage and limited pedestrian access.
4. Does the property have any known contamination/environmental concerns based on previous environmental studies, if any, or does an environmental assessment need to be conducted?
  - No contamination has been documented. Community Development is not aware of any past studies.
  - There is nothing to indicate a trigger exists for an environmental assessment.
5. Does the property have any architectural, historical, or recreational value? Does the Town's ownership have a role in preserving these values, or are they protected by other means?
  - Please refer to the archaeological report prepared *Davis MacIntyre & Associates*
  - The area is in the Old Town Lunenburg UNESCO World Heritage Site Buffer Zone.
6. Does the property have any ecological/conservation value?
  - The land is currently unmanicured green space.
  - The area was historically cleared of vegetation.
  - Portions of the site are steep slopes, and are devoid of wetlands or watercourses.
7. Does the Town's ownership have a role in preserving these values or are they protected by other means.
  - It is protected under the Land Use By-law—development rules under restrictive covenants or development agreements are also being explored. They will be brought before Council later if Council so directs.
7. Has fair Market Value for the land been determined?
  - An appraisal is underway and may be discussed in camera at a later date.

8. Is the land adjacent or nearby water (river, lake, ocean)?
  - Ocean (Back Harbour) across Highway 332 from the site.
  - Some small wetlands are on the Back Harbour Trail and/or Highway 332. None are directly adjacent to the site.
  
9. Is the land already in use?
  - No. See Attachments A, B and C. Sylvia Park and the Campground are not included in the lands under consideration to be declared surplus.
  
10. Are there any known public concerns relating to the divestiture of the property?
  - Yes. Please see Town Correspondence and the Blockhouse Hill Design Project What We Heard Report, linked above.
  
11. Is there possible future liability/gain (i.e. useful site in the future or site features such as erosion that suggest any divestiture would result in a liability)?
  - No.
  
12. Has an electrical scoping evaluation taken place?
  - This analysis is underway and may be discussed in camera at a later date.
  
13. Do stakeholders such as nearby landowners, community associations, and/or members of the public need to be consulted?
  - Yes, under Sub-Section 8.3.1 of the 'Land Divestiture Policy' (see above for more information).
  
14. Consideration of the current and future carrying costs associated with not proceeding with the potential sale, including, but not limited to, cost of operation, maintenance, and utilities.
  - This analysis is underway and may be discussed in camera at a later date.