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# Flood Risk Assessment Study

## Background Report - DRAFT

December 2021



**Prepared for: The Township of Whitewater Region**  
44 Main Street  
Cobden, Ontario K0J 1K0



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# 1 Introduction

Jp2g Consultants Inc. partnered with the Township of Whitewater Region ('the Township') to complete a flood risk assessment for an area south-west of the Westmeath Provincial Park along the Ottawa River which includes a Provincially Significant Wetland and some non-conforming (grandfathered) properties situated in the floodway or flood fringe. This area seasonally floods with the spring freshet and represents a significant and recurring flood risk. The Township has identified flooding in its Hazard Identification and Risk Assessment. The project has been done in accordance with the technical guidelines set out under the technical guidelines for the flood hazard mapping in Ontario (Ministry of Natural Resources [MNR], 2002), and the Public Infrastructure Engineering Vulnerability Committee (PIEVC) Protocol.

## 1.1 Background

The general area was severely impacted by 2019 flooding with several property owners relying on the Disaster Recovery Assistance for Ontarians (DRAO) Program to address flood damage. More than 75,000 sandbags were deployed to the area. The study area requires significant sandbagging and pumping efforts each freshet. In 2019 because of flooding, the high water and wave action caused varying amounts of damage. Numerous properties were required to be renovated, raised, reconstructed, or demolished.

Water levels of the Ottawa River around the area pose risks to nearby infrastructure in the spring. Portions of land become fully submerged, and buildings have experienced flooding at peak water levels. Seasonal high-water levels continue to pose a serious risk to infrastructure. New high-water levels were observed in 2017 and 2019 and represent a trend toward more frequent flooding occurrences. The current method to deal with flooding is to install seasonal sandbag coffer dams along the properties adjacent to the Ottawa River where water encroaches on permanent residences, cottages, and roadways.

Historically, flooding of the project area has been a threat mainly due to the flat, low-lying topography of the area relative to the adjacent water body, being the Ottawa River. The history of overland flooding from this portion of the Ottawa River has been documented in shoreline studies and damage surveys including the Flood Damage Reduction Program (FDRP) prepared by Environment Canada, the Ontario Ministry of Natural Resources, and the former Township of Westmeath in the late 1980's, early 1990's. The FDRP Ottawa Risk Flood Maps project was composed of three phases, of which the project area comprises Phase 1, and indicates that the two-zone approach is applicable (i.e., identification of the floodway and flood fringe areas).

## 1.2 Purpose

The purpose of this project is to develop a mitigation plan including seasonal and permanent measures to address the flooding concerns. The mitigation plan will be developed through the completion of a flood assessment study that analyzes the current state and the vulnerability of infrastructure to seasonally high-water levels. The goal of this project is to generate emergency procedures as well as short-term, intermediate, and long-term solutions to mitigate effects of high water on existing infrastructure. This project will prioritize areas for rehabilitation and identify projects for future construction.

The flood risk assessment study will evaluate the two-zone flood management policy by documenting and assessing the condition of the existing flood control measures, documenting the condition of the existing infrastructure, quantifying the risk to the flood-prone areas under various scenarios, preparing a prioritized action plan to address and mitigate the risk of flooding, and identifying alternative solutions for flood protection measures in the general area.

### 1.3 Site Location

The study area is south-west of the Westmeath Provincial Park along the Ottawa River, which includes a Provincially Significant Wetland and some grandfathered properties situated in the floodway or flood fringe. The study area is illustrated in **Figure 1** below. The study area is bound by the Ottawa River to the north, Westmeath Provincial Park to the east, Westmeath Road (County Road 12) to the south, and west of Moores Beach Road to the west.

The area comprises 105 properties, from the area west of the Westmeath Provincial Park along the Ottawa River from Greatview Trail to Moore’s Beach Road, including Sunset Trail, Edgewater Trail, McWitt Trail and Sand Point Road.

The risk assessment will provide recommendations to property owners, as well as the Township, on ways to mitigate flood risk and response. It will help prioritize funding and potentially reduce claims under the Disaster Recovery Assistance for Ontarians Program (DRAO) and Municipal Disaster Recovery Assistance Program (MDRAP).

Figure 1: Study Area Location





## 2 Background Information

### 2.1 Site Review

Jp2g conducted general onsite field investigations, with a focus on the areas of special concern including Greatview Trail, Edgewater Trail and Sunset Trail. During the field visit, the general site topography was reviewed, as well as the structures within the floodplain, existing flood mitigation features, and locations for proposed (temporary or permanent) flood proofing solutions. Historically, flooding of the project area has been a threat mainly due to the flat, low-lying topography of the area relative to the adjacent Ottawa River.

It was evident that existing flood proofing measures were present on certain properties along Greatview Trail and Edgewater Trail. There were several structures that had been raised onto cinderblocks, had open foundations, or had raised their decks to be above the floodplain elevation.

The pictures taken on site are attached in [Appendix A](#).

### 2.2 Interviews with Homeowners

A newsletter was sent to the property owners' which included the scope of the project, schedule, and a request for information to support the project. Information gathering has occurred through 1-on-1 interviews, phone calls, and emails received from property owners. Information collected from the homeowners included a description of damages, specific locations of flooding, what flood mitigation measures were successful, 2019 flood limits and seasonal flood limits.

#### 127 Greatview Trail

- Residents raised their deck approximately 4ft after 2019 flood. The cottage was also raised 4.5ft.
- Every spring, approximately 2/3 of road is impassible even with sandbagging; water comes around onto road through Bellows Bay. Annually, there can be water on the road up to the third week of June. Although, in 2018, there was no water on the road.
- Wave action seemed to be the problem in 2019; waves were 2-3ft high which went over the sandbags in most places.
- Greatview Trail has lower topography than Edgewater Trail & Sunset Trail.
- Water can fluctuate annually, and throughout the summer; contamination can happen, and things float away downstream.
- These local homeowners are invested in the area, some have been here approximately 70 years.
- Residents are paying residential taxes for cottage properties.
- Bellows Bay is more of an issue; flood waters come around
- Only primary/permanent residents on Greatview Trail got funding for permits (3 or 4 only on Greatview).
- Seasonal flood causes no damage to cottages
- Could make water-resistant houses, raise cottages, etc.
- Residents would like to live in harmony, co-exist with OPG, Quebec Government; agencies are still able to make a lot of money.
- If the Township can be an ally for taxpayers, and take that to OPG, didn't get any little breaks from the Township after the flood.

#### 49 Greatview Trail

- There are only hydrometers in Pembroke and Lac Coulonge, which is not indicative of what is happening here. Up until 1995, there was a hydrometer here (near Spotswoods Landing), but OPG removed it.



One resident is working with Councillor Neil Nicholson and OPG to work on getting one back to give an accurate depiction of what is occurring in Westmeath.

- Dams: Rolphton to here = 8-hour delay; Temiskaming to Rolphton = 1.5 days; no warning system of dam changes
- In 2019, in Rolphton, they raised the levels above the dam to 1ft from the top (overdid it); once the runoff came in, they had to release more than anticipated and therefore an abundance of flow came through.
- Dam parameters may need to be adjusted, there is concern about low limit and high limit for dams; Upstream of dam was empty; Lower 1ft and could save many cottages
- There are a series of reservoirs between Gatineau and Pembroke (could go through Wakefield)
- The governing bodies don't want to give up the information
- Governing bodies/perhaps OPG diverted water up here in 2017, they said they know the water was going down here, and wanted to save houses downstream instead (Ottawa, etc.); Diversion – OPG and Quebec Hydro are making money, OPG makes more with more water diverted; these companies are making money at the local homeowners' expense, while they spend their time repairing.
- There are no operators at the dams, just relying on instrumentation, and there is no hydrometer here
- No warning system of dam changes
- Can we relieve the problem? Maybe get permission from MNRF to dredge the river? MNRF says this would send the problem downstream. There are remnants of rocks from logging operations, which blocks off the river.

#### **119 Greatview Trail**

- 2017 flood waters came up to the base of the cottage, in 2019 there was approximately 2ft of water in the cottage; & then Ottawa and Montreal started to flood, maybe dams closed to reduce the impacts downstream, and therefore water backed up in the Westmeath basin.
- There is a natural bottleneck with two small rivers downstream. The water sits here in a reservoir since it is backed up.

#### **19 Edgewater Trail**

- No support from Whitewater Region; as cottagers, they are second class
- In 2017, there was minor flooding in the garage
- In 2019, only the top 2 ft of the garage was above water; trailer & addition flooded, halfway up the front windows and through large kitchen window into the trailer; lots of damage occurred under the trailer
- A few weeks ago (from August 17, 2021), the water came up approximately 2 ½ ft, and in Arnprior it only went up 3 inches. How did this happen?
- Cottagers pay the same taxes as permanent residents but don't get the funding.
- Ideally would have brought another trailer in after the 2019 flood, but Whitewater Region didn't allow it. Allowed to renovate the addition, but in order to bring in another trailer they would have had to raise it on to gravel
- Only a few permanent residents on Edgewater Trail
- Flood hits fast, not much warning
- Property was shown on CTV news three nights in a row

#### **25 Edgewater Trail**

- Original structure built in 1959/1960
- Seasonal flood comes up to 1 ½ ft below rock wall (and stairs down to beach)
- Wave action adds 2 ½ ft



- In 2017, water came up over the rock wall, into the crawl space. Sandbags worked to protect some areas
- In 2019, twice as many sandbags were used, deck washed away, more damages
- Permit was issued to renovate
- Raised their cottage and the bunk house above the 100yr flood line. The front section of the bunk house is within the flood line but has been finished with marine grade materials.
- Spent approximately \$300,000 on repairs and still working on it
- Water comes through provincial wetland
- Neighbour at 33 Edgewater Trail had water halfway up cottage in 2019
- Based on the Township of Whitewater Region By-law, the permit had to be opened within 12 months of the flood to support renovation. If not, the property could be considered abandoned, and the buildings forced to be torn down.

### 99 Greatview Trail

- Cottage was built in 1960, and therefore higher than the highest water mark of the previous flood of 1960, so it was one of only a few on the beach that escaped major damage in the 2019 flood. The water came up to a couple inches below the floorboards of the cottage, and half-collapsed the deck. The homeowners had to canoe and paddleboard down Sand Point Road and Greatview Trail to get to the cottage. It was far more than sandbags could handle. The sand of the beach has been eroding for decades from the bottom of the retaining wall and has probably dropped at least a couple feet in the last few decades, and the land at the top of the retaining wall is therefore sinking.

### 85 Greatview Trail

- Displaced in 2019 for three months, have recovered less than 50% of losses through insurance and DRAO
- Flooding was largely due to mismanagement of flow in the Ottawa River from the dams at the northern end as the water flowed through far too late and too rapidly during the spring freshet
- Blaming climate change and precipitation which likely accounted for 10% of the flooding was both frustrating and lacking any semblance of communication with the stakeholders

### 75 Greatview Trail

- 2017 flood barely missed going into cottage; sandbags were placed to keep piers intact
- In 2019, there was 23" of water in one section and 9" in another section for several weeks; the cottage was sitting in the middle of the river
- Small existing retaining wall in front, seasonal water never reaches the top of it
- Every spring, the water comes up the road they drive in, by the middle of June it has cleared

## 2.3 Desktop Review

A detailed review of all available drawings, relevant as built drawings, site conditions, background reports and studies, letters and information on file has taken place. Below is a summary of the background studies that were reviewed as part of the Flood Risk Assessment Study.

### 2.3.1 Reports

**An Independent Review of the 2019 Flood Events in Ontario**, prepared by Douglas McNeil, P.Eng., October 31, 2019

During spring of 2019, heavy rains paired with melting snow and a sudden temperature increase led to devastating flooding across many areas throughout northern and southern Ontario. As a Special Advisor on



Flooding, Douglas McNeil, P.Eng., was appointed by the government to provide expert advice to the Minister, and to make recommendations to the government on opportunities to improve the existing flood policy framework.

Doug McNeil explained that major storm events that contribute to significant flood events will happen again, but with climate change we can expect that they will be more frequent and/or more significant. He notes that historic investment in flood mitigation infrastructure, such as dams, dikes, flood channels and shoreline protection, has delivered structural solutions to reduce flood risk to existing and new developments in floodplains. He also says that the sheer amount of water on the landscape directly contributed to the flooding in 2019, due to the amount of snow and rainfall.

It was noted that Environment and Climate Change Canada characterized the 2018/2019 winter as very long and extremely cold, including higher than normal snowfall across northern, central, and eastern Ontario. The key drivers leading up to the flooding of spring 2019 included a colder than average winter, larger average snowpack, and higher than average snow water conditions. The spring temperatures were colder than usual, and there were many heavy rainfall events that contributed to the flooding.

It was explained that recent climate change reports have suggested that Canada's climate is warming twice as fast as the global average. Changes in temperature can affect the timing and extent of snowpack development, soil freezing, snow and ice melt, and rainfall potential during colder seasons, as well as the timing, intensity, duration, amount, and phase of precipitation events.

It was also noted that OPG has a heightened level of control and storage on flows and levels on the Ottawa River when flows are considered normal outside of freshet periods. However, OPG generating stations do not have the ability to store enormous amounts of water and manipulate levels that would prevent extreme high water and flooding in conditions experienced in spring 2017 and 2019.

The significantly affected area in the vicinity of Westmeath is situated within the floodplain of the Ottawa River under the 1% flood (pursuant to mapping prepared under the Canada-Ontario Flood Damage Reduction Program during the 1980s and early 1990s). This area is also mapped to be in the floodway, where flood depths can exceed one metre and/or flow velocities above one metre per second can create significant hazards for development. Many of the dwellings along the Ottawa River in this area were once modest camps that were transitioned into seasonal cottages, and now many exist as permanent year-round residences.

Several recommendations were made throughout the report to address flooding in Ontario. It was recommended that the MNRF update floodplain mapping technical and implementation guidelines recognizing new technology and approaches for flood hazard and flood risk mapping. It was also recommended that the Province update its technical guides pertaining to floods and natural hazards. This includes undertaking a review of the flood event standards, with a view to providing for current science and climate change, as well as reviewing the floodplain areas (floodway, floodway fringe, shoreline setbacks). It was recommended that the Province continue to monitor the effectiveness and location of gauges to ensure that there is appropriate coverage and consider repositioning gauges if necessary. It was recommended that the Province review the funding formula for eligibility of municipalities under the Municipal Disaster Recovery Assistance program, and that the "build back better" pilot under the DRAO program move from a "pilot" to a full program. The program should be tied to legislated flood protection levels and floodproofing criteria. It was also recommended that the DRAO program be flexible enough to allow for removal of the structure from the floodplain (buyout) if this is the only technically and financially feasible option. It was also recommended that the International Joint Commission, the Ottawa River Regulation Planning Board, and Ontario Power Generation make their detailed information about their flood operations readily available on their respective websites.





### 2.3.2 Flooding in Study Area

According to the Ottawa River Regulation Planning Board, “there is no one agency responsible for the regulation of water, due to the multi-jurisdictional nature of the Ottawa River. A group of agencies, each responsible for their own operations, comprise the Ottawa River Regulating Committee and work together with the purpose of integrating the management of the flow from the thirteen principal reservoirs in the Ottawa River basin. During the spring, the goal of this management is to minimize the impacts of flooding as much as possible.

In the spring, water levels on the river increase naturally because the volume of water that flows into the river is increased by the natural runoff from snow melt and rainfall. The natural constrictions on the river and other features such as islands restrict the flow of water. Under natural flow conditions in a river the water level will increase as the flow increases. In 2019, the Ottawa River basin was hit by heavy rainfall when the melting of a deep snowpack was already causing historic floods on the tributaries that feed into the Ottawa River. The water contained in the snowpack was approximately twice that of a normal year in early spring.”

According to CTV News, the Disaster Recovery Assistance for Ontarians (DRAO) program could provide a maximum of \$250,000 to permanent residents after the 2019 flood. The Disaster Recovery Assistance for Ontarians is designed to help people affected by natural disasters get back on their feet. DRAO provides financial assistance to individuals, small owner-operated businesses, farmers, and not-for-profit organizations. Homeowners (primary residence only) and residential tenants are eligible to apply (Government of Ontario).

Flooding along Ontario’s rivers, lakes and streams can occur at any time of the year and there is concern that the likelihood of extreme weather and flooding will increase with a changing climate. Ontario’s approach to managing flood risk is based on the core components of emergency management. The four pillars of emergency management related to flooding include mitigation and preparedness prior to the flood, and response and recovery after the flood. The mitigation phase includes keeping people and property out of flood-prone areas and taking steps like floodproofing and other approaches to reduce the impact of flooding. Successful implementation relies on partnerships between provincial ministries, municipalities, Indigenous communities, conservation authorities, stakeholder organizations and the federal government. Priorities include enhancing flood mapping, enhancing flood preparedness, and investing in flood risk reduction. The Office of the Auditor General suggests that up-to-date flood maps would allow municipalities to better plan for future growth in areas of low flood risk and build infrastructure resiliency in high-risk flood areas. Ensuring Ontarians have access to current and timely information in order to prepare for flood events is a priority. Climate change scenarios are indicating that Ontario may be exposed to more intense heavy rainfall events and corresponding flooding. Having flood protection, mitigation works and activities that are well funded would be an intended outcome of this priority. The Flooding Strategy seeks to ensure Ontarians can access funding programs for flood protection and mitigation works and help municipalities and conservation authorities to invest in local flood risk reduction initiatives.

#### **2017 Spring Flood Summary**

According to the Ottawa River Regulation Planning Board, unusually heavy rainfall, coinciding with melting snow that had already saturated the ground and swollen waterways, generated exceptional volumes of water in the Ottawa River basin in 2017. This generated record volumes and major peak water levels in the Ottawa River and its tributaries, exceeding those set in 1974 and 1976, causing major flooding in the southern section of the basin, from Chats Lake to Montreal.

Spring floods largely depend on weather conditions that can only be predicted a few days in advance, including precipitation, duration and trajectory of rain and the temperature. The snow cover is an additional risk factor, but in 2017, the snow accumulation levels were less than 2016, and therefore do not directly correlate with the flooding. In 2017, the precipitation totalled 257mm in April and May, which is a 174% increase from the normal



values. According to the Environment and Climate Change Canada, major precipitation records were set in the month of April. The exceptionally heavy precipitation combined with the melting snow on the ground led to water volumes that were much above normal.

Flood reduction measures are undertaken annually in preparation for the spring runoff, which involves emptying the principal reservoirs during the winter period to provide storage for the spring melt. Integrated reservoir management maximizes the use of this storage and allows dam managers to coordinate operations between multiple reservoirs to minimize flood damage. In 2017, reservoirs were emptied by the end of March. In early May, at the height of the spring flooding, the storage capacity of the reservoirs was being used nearly at full capacity.

### **2019 Spring Flood Summary**

During the 2019 spring freshet, the regulation strategy consisted of reducing water flow from the principal reservoirs while southern tributary rivers such as the Petawawa, Dumoine, Coulonge, Mississippi, Petite Nation and Rouge rivers reached their peak and started to recede. Due to this strategy, it was estimated that peak water levels were reduced by 40cm. In 2019, the water contained in the snowpack was approximately twice that of a normal year, and due to cooler than normal temperatures, there was little reduction of the snowpack prior to the spring runoff. Flows in the Ottawa River vary from year to year because the weather conditions over the watershed such as precipitation and temperatures change from year to year. The principal reservoirs in the Ottawa River basin have a storage capacity of approximately 40% of the average spring runoff.

#### **2.3.3 Westmeath Provincial Park**

The Westmeath Provincial Park Management Plan is an official policy for the management and development of Westmeath Provincial Park. Westmeath Provincial Park is one of the few undeveloped areas remaining along the Ottawa River in Ontario. The Park possesses a diversity of landforms including a sand dune system and a 1,980-metre sand beach. The area of the park is 610 hectares, 353 of which are dry land. Representative and significant life science features also exist on the property including a dry beach community, lowland and upland forest community and a wetland.

Sand carried by the river current was, and still is, continuously being deposited at this large bend in the river. The sand spit is slowly growing northeast into the Ottawa River, creating an enclosure for a large wetland known as Bellows Bay. The Westmeath Provincial Park Management Plan provides policies, which guide the careful development and management of the park. Westmeath Provincial Park is classified as a Natural Environment Park under the Provincial Park Classification System. This is the most appropriate classification given the need to balance the protection and recreational use of the site. One of the park objectives is to protect significant elements of the natural and cultural landscape of Westmeath Provincial Park.

The Park contains three Nature Reserve Zones. They encompass the following areas of earth and life science significance: Sand Point, the cusped foreland, and the southern end of Bellows Bay. Almost 50 percent of Westmeath Provincial Park's land base has been designated Nature Reserve Zones to protect its significant features. Bellows Bay Nature Reserve is 55 hectares in size and is characterized by open water with a border of wet meadow in the northern end and a complex marsh community in the southern end.

Natural water fluctuations will provide the best management of the vegetative, fish and wildlife communities in Bellows Bay.

### **2.4 Topographic Survey**

A topographic survey was completed at 7 Greatview Trail, Westmeath, on November 18, 2020, by Adam Kazprzak Surveying Ltd. A site plan was issued on February 24<sup>th</sup>, 2021, by Jim Bell Architectural Design Inc.

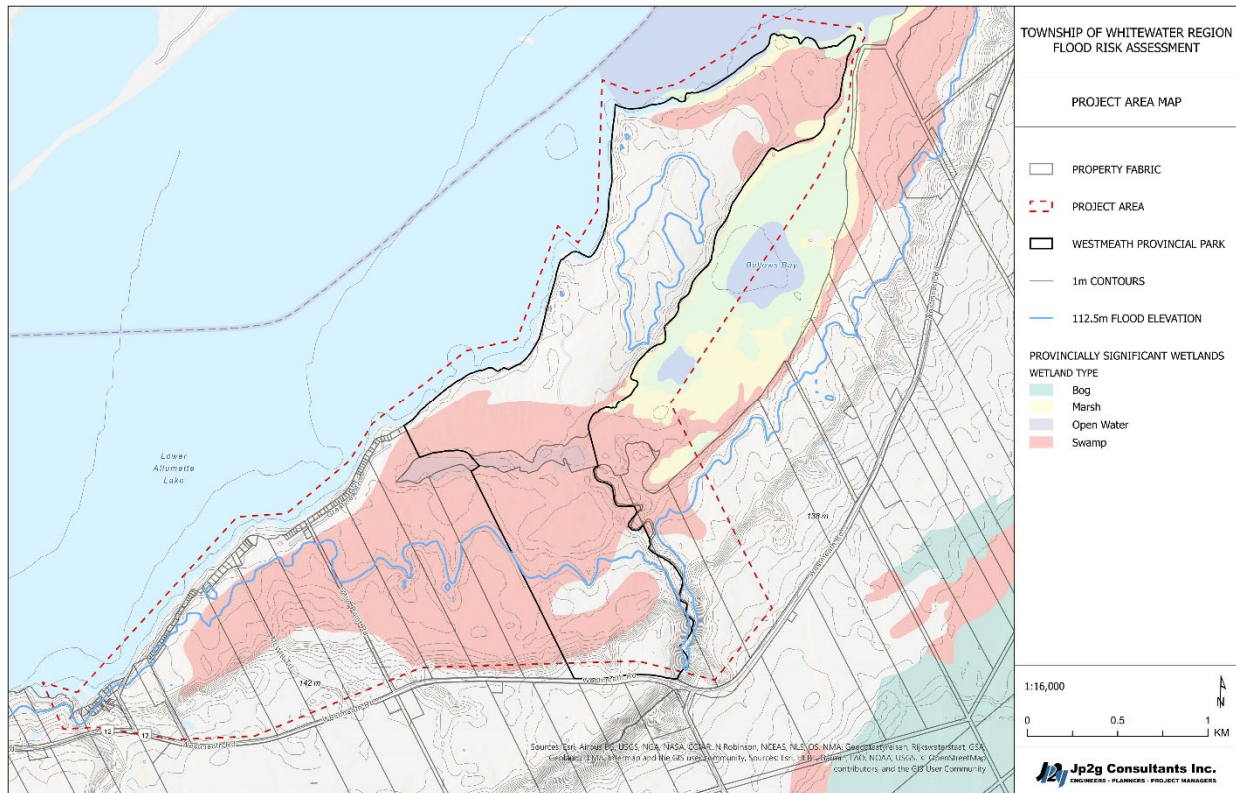
A topographic survey was also completed at 16 Greatview Trail, Westmeath, on September 23<sup>rd</sup>, 2019, by Adam Kasprzak Surveying Ltd. A site plan was issued for building permit on October 1<sup>st</sup>, 2019, by P-Squared (P2) Concepts Inc.

The surveys are attached in [Appendix B](#).

## 2.5 Floodplain Mapping

As shown in Figure 2 below, the majority of the study area is within the flood elevation of 112.50m.

Figure 2: Floodplain Mapping in Study Area



## 2.6 Ottawa River Operating Ranges and Flood Frequency

Due to the lack of hydrometer in the Westmeath basin, there is no accurate water level elevation data for the study area. The Ottawa River water level at Pembroke has been recorded, as well as downstream of Westmeath at Lake Coulonge, but the basins in the Ottawa River are not linear. According to the Ottawa River Regulation Planning Board, the annual extreme water level in Pembroke in 2017 was 113.00m, and in 2019 was 113.71m. The regulatory flood elevation in the study area is 112.50m.

Location	Flood Event		
	2017 (m)	2019 (m)	Historic Peak (m)
Mattawa	153.96	155.64	155.78
Pembroke	113.03	113.71	113.71
Lac Coulonge	108.52	109.10	109.10



## 3 Existing Flood Control Measures and Infrastructure

### 3.1 Existing Flood Control Measures

Seasonally, water levels rise, but no flood control measures are required to protect infrastructure. Retaining walls are present on some properties. In 2017, some residents used sandbags to protect their property, while they were not required for others. In 2019, sandbagging efforts were tremendous, but overall, there was nothing that could have been done to protect houses and cottages, as the river flooded through Bellows Bay and onto the roads, surrounding the properties on Greatview Trail, Edgewater Trail, and Sunset Trail. Very few residents escaped 2019 with no damage.

### 3.2 Existing Infrastructure

After the flood in 2017, some houses and cottages were harmed. Few residents lifted their cottages. In 2019, many homes and cottages had damages that required an abundance of repairs. Due to the lack of funding, some homeowners abandoned their properties, and others decided to renovate and lift their cottages to prevent further damage but had no funding to do so. Based on the DRAO, only permanent residents could receive up to \$250,000 for repairs. Building permits were issued from the Township of Whitewater Region to nine properties on Greatview Trail, and four properties on Edgewater Trail.

Due to the topography of the study area, the water enters Bellows Bay and floods around the south side of the existing houses and cottages. The roads become flooded, and access becomes a problem. In the study area, the only municipally maintained road is Sand Point Road.



## 4 Conclusion

The study area includes a Provincially Significant Wetland within Westmeath Provincial Park, and many non-conforming (grandfathered) properties situated in the floodway or flood fringe. This area seasonally floods with the spring freshet and represents a significant and recurring flood risk. Portions of land become fully submerged, and buildings have experienced flooding at peak water levels. In 2019 because of flooding, the high water and wave action caused varying amounts of damage in the study area. Several property owners relied on the DRAO Program to address flood damage.

The current method to deal with flooding is to install seasonal sandbag coffer dams along the properties adjacent to the Ottawa River where water encroaches on permanent residences, cottages, and roadways. In 2017, sandbags were used as a flood mitigation strategy, which proved unsuccessful leaving some lower lying structures and accessory buildings flooded and requiring repair. Based on the information collected from homeowners, no mitigation measures were successful in the 2019 flood.

The purpose of this project is to develop a mitigation plan including seasonal and permanent measures to address the flooding concerns. The mitigation plan will be developed through the completion of a phased flood assessment study that analyzes the current state and the vulnerability of infrastructure to seasonally high-water levels. The next steps in the Flood Risk Assessment study include a quantification of the risk to the flood-prone areas under various scenarios. Current and future climate conditions under high-risk and low-risk scenarios will be assessed to determine the severity for emergency flood mitigation and property damage. Proposed mitigation measures will be reviewed, and an action plan will be developed to mitigate the risk of flooding in the study area.

Should you require any further clarification, please contact the undersigned.

Sincerely,

### **Jp2g Consultants Inc.**

ENGINEERS • PLANNERS • PROJECT MANAGERS

A handwritten signature in black ink that reads 'A. Bishop'. The signature is written in a cursive, flowing style.

---

Andrea Bishop, P.Eng.  
Civil Engineer

A handwritten signature in blue ink that reads 'Stephen Arends'. The signature is written in a cursive, flowing style.

---

Stephen Arends, P.Eng.  
Project Manager | Civil Engineer



# Appendix A

75 Greatview – photos from Roger Chamberlain











**99 Greatview** – photos from Sheila McCullough







**25 Edgewater Trail** – photos from Rob Byce



**May 11, 2019**



**May 13, 2019**

PIC • COLLAGE











Site Visit – July 7<sup>th</sup>, 2021 – Photos by Stephen Arends, Jp2g













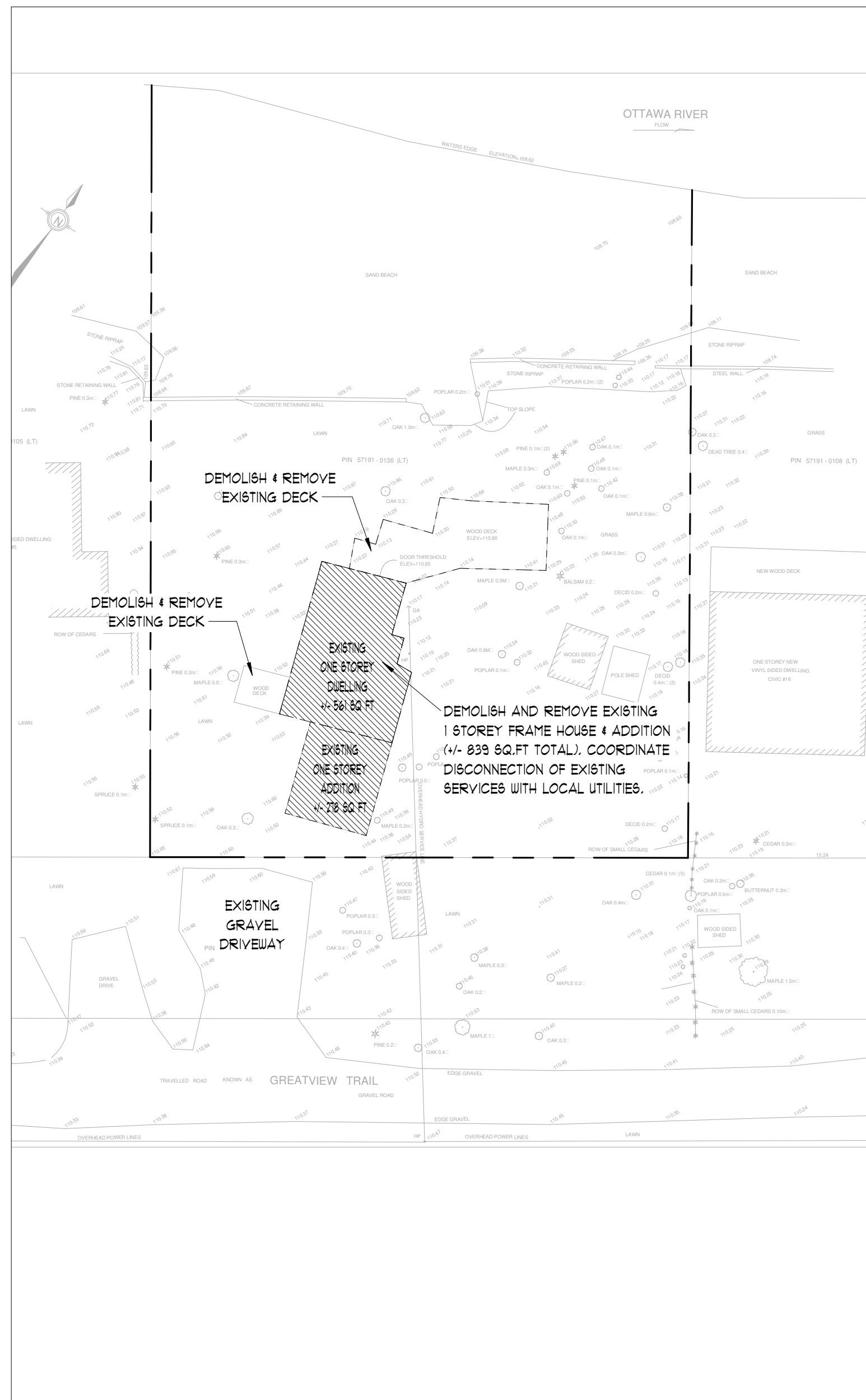




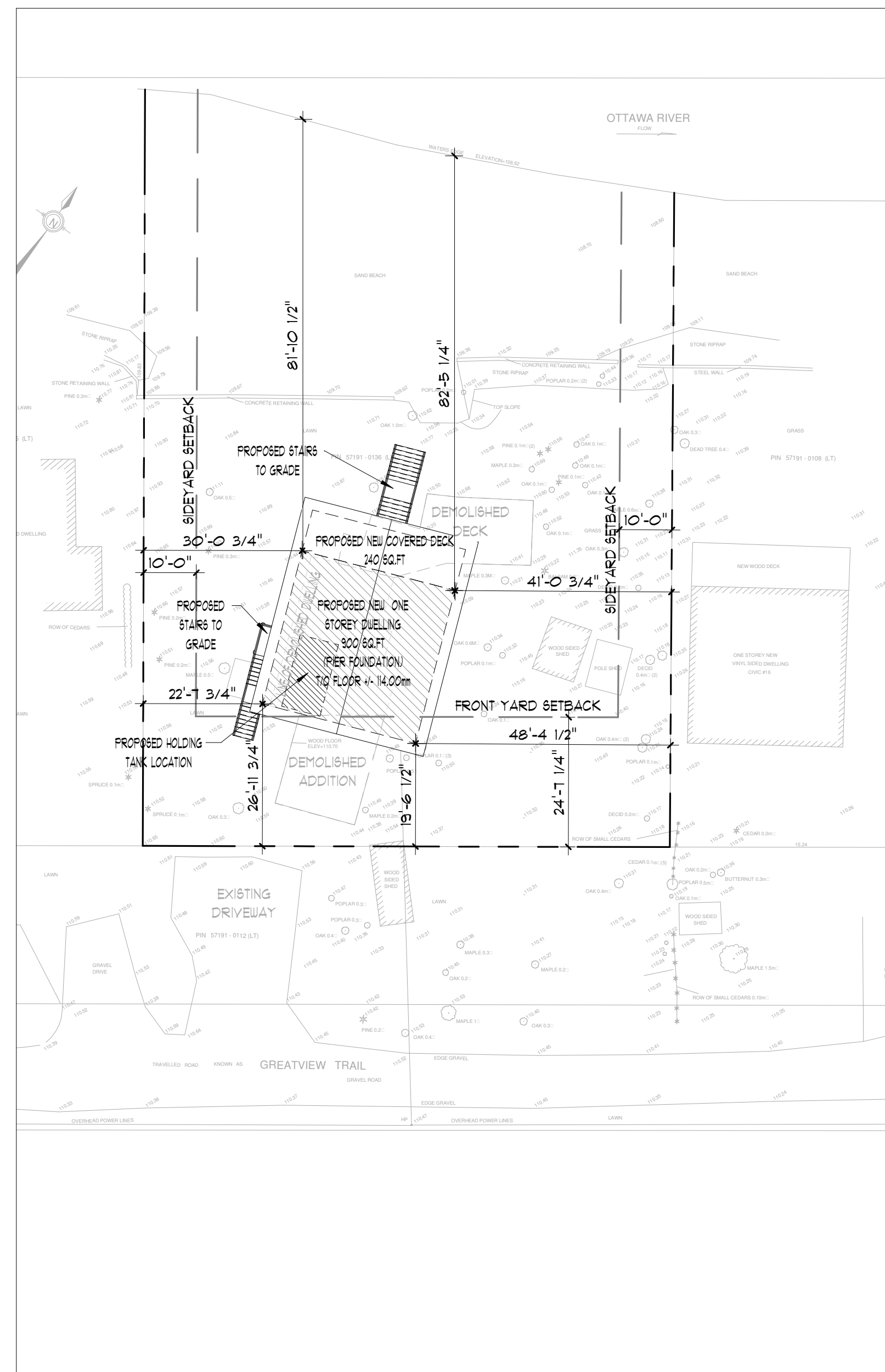




## Appendix B



**2 DEMO SITE PLAN**  
A.1 SCALE: 1" = 20'-0"



**3 PROPOSED SITE PLAN**  
A.1 SCALE: 1" = 20'-0"



**1 KEY PLAN**  
A.1 SCALE: 1" = 300'-0"

PRELIMINARY

**NOTES:**  
REFER TO GENERAL NOTES FOR ALL TYPICAL CONSTRUCTION NOTES & DETAILS. WHEN DRAWINGS OR NOTES REFERENCE O.B.C., IN ALL CASES PLEASE REFER TO THE LATEST VERSION OF THE ONTARIO BUILDING CODE 2012.

**LEGEND:**

(D)	EXTERIOR DOOR & WINDOW TAG (SEE SCHEDULE ON A.O.2)
(I)	DOOR TAG (SEE SCHEDULE ON A.O.2)
(W)	EXTERIOR WALL TYPE (SEE A.O.3)
(P)	INTERIOR PARTITION WALL TYPE (SEE A.O.3)
(F)	FLOOR TYPE (SEE A.O.3)
(R)	ROOF TYPE (SEE A.O.3)
(PI)	POST TYPE (SEE A.O.3)
(LI)	LINTEL TYPE (SEE A.O.3)

**LEGEND:**

(FI)	PAD FOOTING TYPE (SEE A.O.3)
(WFI)	WALL FOOTING TYPE (SEE A.O.3)
(SCD)	SMOKE/CARBON DETECTOR TO O.B.C. 9.10.13
(1)	CONSTRUCTION NOTE (SEE A.O.3)

**Jim Bell**  
Architectural Design Inc.

Stittville Office  
26 Bert G. Argan Drive  
Stittville, Ontario  
K2S 1X9  
p. 613-831-9688

Pembroke Office  
Unit A 184 John Street  
Pembroke, Ontario  
K8A 1H7  
p. 613-629-6988  
e. info@jbell.ca

VERSION NO. \_\_\_\_\_  
SEAL: \_\_\_\_\_

**NOTES:**

- ALL CONTRACTORS MUST COMPLY WITH ALL CODES & BYLAWS HAVING JURISDICTION.
- IT IS THE RESPONSIBILITY OF THE APPROPRIATE CONTRACTOR TO CHECK & VERIFY ALL DIMENSIONS ON SITE & REPORT ALL ERRORS AND/OR OMISSIONS TO THE DESIGNER PRIOR TO COMMENCEMENT.
- DRAWINGS MAY NOT BE USED FOR CONSTRUCTION UNTIL NOTED AS ISSUED FOR CONSTRUCTION.
- DO NOT SCALE DRAWINGS.
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**REVISIONS**

NO.	ITEM	DATE
1	SITE PLAN ISSUED	22/03/21

**PROJECT**  
1 GREATVIEW TRAIL, WESTMEATH ON. KOJ 2LO

**CLIENT**  
MURRAY MCDONALD

**DRAWING**  
SITE PLAN

SCALE As indicated

DRAWN BY AAC

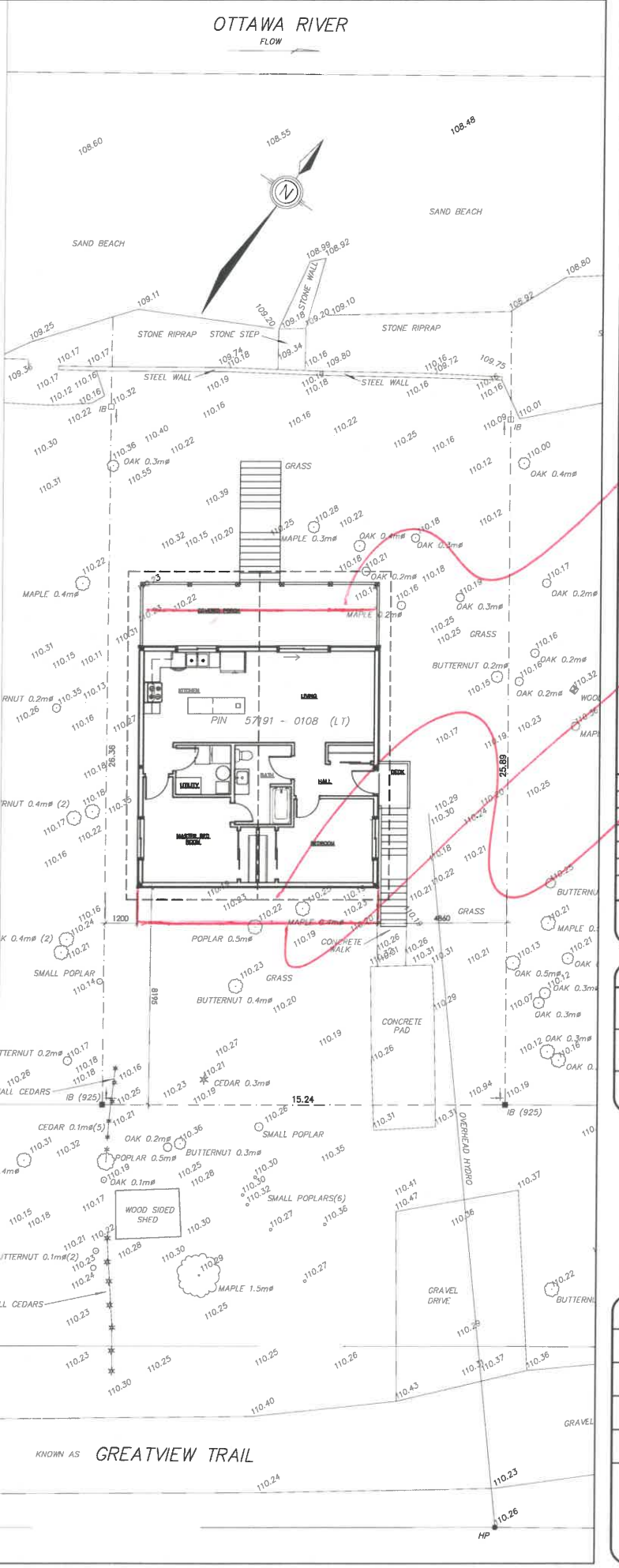
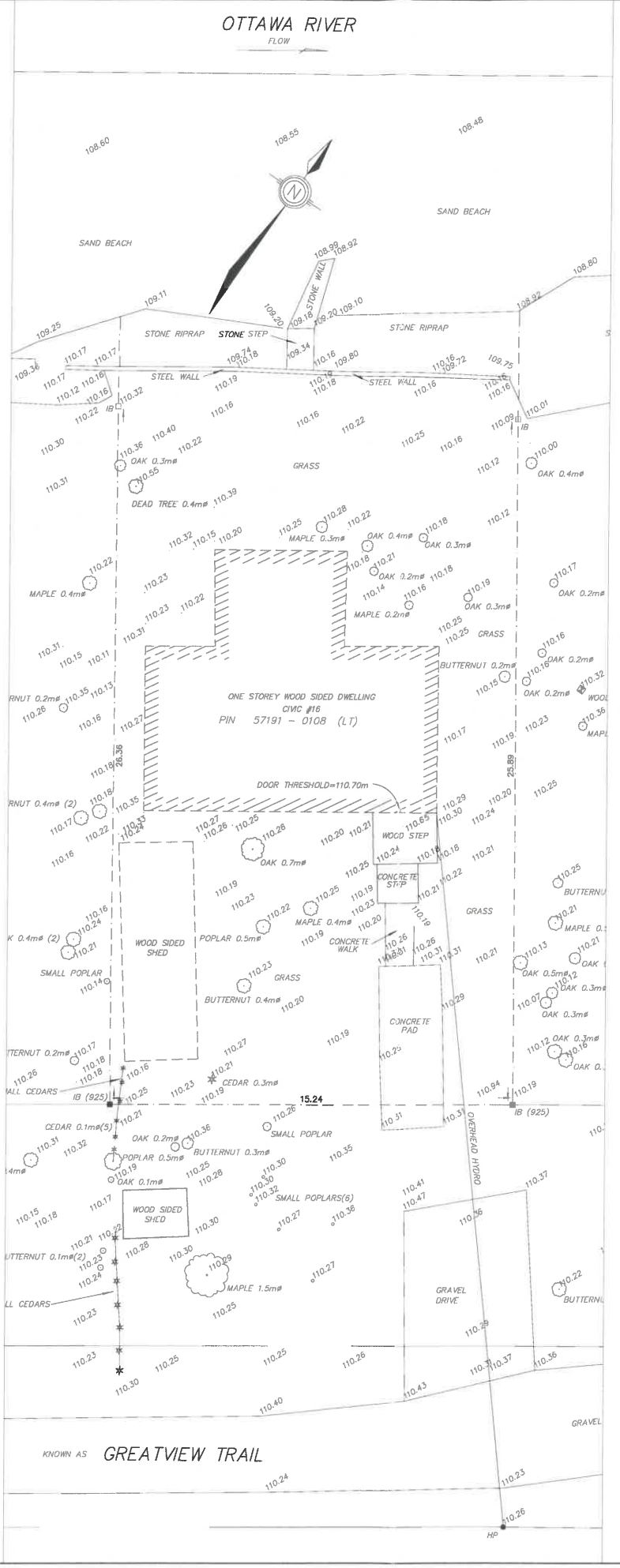
DATE 24FEB21

CHKED BY JB

APPRD BY JB

PROJECT NO. 220-44

SHEET NO. **A.1**



- Reviewed & approved
  - Reviewed & approved as no:
  - Revise & resubmit
- Zone: W.D.S. LAW 98-B

This review is for the sole purpose of ascertaining that the location, the building and the type of dwelling/structure conforms with the Town's by-law in terms of zoning. Any modification to the location shall be reported to the Department of Development & Works for approval.

*21.05.2019*

*\* New Dwelling must be RAISED ABOVE Regularly Flood Elevation OF 112.5m AS SHOWN ON THE OTTAWA RIVER FLOOD RISK MAP, PHASE I*

*\* Elevation certificate must be SUBMITTED FOR OCCUPANCY.*

ALL CONTRACTORS TO VERIFY ALL DIMENSIONS ON SITE AND TO REPORT ALL ERRORS AND/OR OMISSIONS TO THE ARCHITECT.  
ALL CONTRACTORS MUST COMPLY WITH ALL CODES AND BYLAWS AND OTHER AUTHORITIES HAVING JURISDICTION OVER THE WORK.  
DO NOT SCALE DRAWINGS.



*Address of Caveland Parcel*  
*Edges of Proposed Dwelling Location*  
*Relocate Proposed Dwelling 1.5m Back From Proposed Location*

6			
5			
4			
3			
2	ISSUED FOR BUILDING PERMIT	01-10-19	S.B.
1	ISSUED FOR REVIEW	20-09-19	C.H.
NO.	REVISION	DATE	BY

ALL DIMENSIONS AND CONDITIONS TO BE VERIFIED ON SITE. FIGURED DIMENSIONS TAKE PRECEDENCE OVER SCALE.

CONSULTING ENGS.	
STRUCTURAL	
MECHANICAL	
ELECTRICAL	

**P<sup>2</sup> concepts**  
739 RIDGEWOOD AVE., UNIT 201  
OTTAWA, ONTARIO, K1V 6M8

NEW RESIDENCE

16 GREATVIEW TRAIL PEMBROKE ONTARIO	
DATE: 05-09-2019	SCEAU: SEAL:
ECHELLE: SCALE: AS NOTED	
DESIGNE: S. BROWN	
VERIFIE: P.R.	

DRAWING NAME	0352
	SP-1

*Sony Johnson Oct 18/19 On behalf of client*