

Prepared By:



Chapman's Zoning Review - North Lands

Preliminary Stormwater Management Report

GMBP File: 215158

Revised: August 2021

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PRELIMINARY STORMWATER MANAGEMENT REPORT

CHAPMAN'S ZONING REVIEW - NORTH LANDS

REVISED: AUGUST 2021

GMBP FILE: 215158

1. INTRODUCTION

Chapman's Ice Cream (Chapman's) is proposing to construct an 8,360 m² (90,000 sq. ft.) freezer addition to the north side of the existing Phoenix Ice Cream Production Facility located at 100 Chapman's Crescent in the northerly end of Markdale, Municipality of Grey Highlands, where shown on **Figure No. 1**. For the purpose of this report, Highway 10 (Toronto Street) is assumed to run in a north-south direction and is located east of the subject property.

The original 14.57 ha property consists of two production facilities; the peanut-free Phoenix plant and the non-peanut free Nut House plant, and a Waste Treatment building. Several smaller auxiliary buildings and parking areas are spread throughout the subject property. About 2015, Chapman's acquired an additional 33 ha of land immediately north of the original property. The newly acquired lands are within the adjacent Township of West Grey. About 2017, Chapman's built a similar 90,000 sq. ft. addition, which extended the original building footprint to the original northerly property line. The currently proposed addition is to be constructed on the north side of the Phoenix Building, on the recently acquired lands within the Township of West Grey.

The original SWM Report (March 2010), prepared in support of the Phoenix plant Site Plan Development, was updated in November 2016 to include the 2017 freezer addition. No change was required to the SWM Pond at that time. The purpose of this report is to update the Stormwater Management (SWM) plan for the subject property to ensure that it will continue appropriately to service the Site with the planned freezer addition. The existing stormwater management plan was approved by the Ministry of the Environment and Climate Change (MOECC) on June 15, 2010 with an Amended Certificate of Approval for Industrial Sewage Works (No. 8028-83PS3Z), a copy of which is included as **Appendix A**.

2. EXISTING CONDITIONS

2.1 Historical Drainage – Prior to 2011

Prior to the construction of the original Phoenix Building in 2011 the subject property was divided into two drainage areas. Runoff from the undeveloped easterly portion of the property generally drained overland from southeast to northwest, to the neighbouring property to the north.

Runoff from the developed portion of the Site, which consisted of a Dry Goods Warehouse (converted now to the Nut House building) and associated parking, drained via a storm sewer system through an oil/grit separator, to the southerly inlet of a SWM facility where all runoff water was stored and infiltrated into the ground.

2.2 Existing Conditions and Site Development

In 2011 and 2012, after fire devastated the off-site Chapman's Plant, the Phoenix building and associated parking and servicing was constructed on the subject property. To address the increased stormwater runoff from the property, the size of the SWM facility was increased by extending the SWM facility to the east at its northerly end and adding a forebay and an additional inlet point. The stormwater management system is outlined in the supporting SWM Report prepared by Gamsby and Mannerow Ltd. (now GM BluePlan Engineering Ltd.) dated March 2010.

The storm sewer system located to the south of the Nut House plant continues to outlet to the oil/grit separator and the SWM facility's southerly inlet while a separate storm sewer system that drains runoff from the rooftop and parking areas for the Phoenix plant discharges to the easterly inlet of the SWM facility.

As part of the construction of the Phoenix plant, a swale was constructed at the toe of the grassed slope to the east of the Phoenix plant. The swale directed runoff from the easterly undeveloped portion of the site to the grassed field to the north, where runoff was expected to naturally disperse and infiltrate into the native sandy soils.

In June 2010, the MOECC provided the current Amended Certificate of Approval No. 8028-83PS3Z for the larger SWM Facility and forebay system to provide stormwater quantity control and quality treatment for the Phoenix plant and associated parking and driving areas.

2.3 Existing SWM Facility

The existing SWM facility is designed as an infiltration basin with an "L-shaped" geometry to receive inflow from each of the developed portions of the easterly Phoenix plant area and the westerly Nut House plant area, through two separate inlet points.

Runoff from the Nut House plant area receives pre-treatment via an oil/grit separator prior to discharging to the southerly point of the SWM facility main basin.

Runoff from the Phoenix plant area discharges at the easterly point of the SWM facility, receiving pre-treatment within an 80 m-long forebay. A 1.0 m-high flow check dam, consisting of rip-rap, filter cloth and a 25 mm clear stone cover, separates the forebay from the main basin to provide filtration of flows prior to entering the main basin where infiltration occurs. Under greater runoff events, inflows may pond in the forebay to a depth of 1.0 m prior to spilling over the flow check at an elevation of 413.25.

The forebay is generally designed in accordance with the MECP's Stormwater Management Planning and Design Manual (SWMPD Manual).

The bottom of the forebay varies in elevation from 412.25 m to 412.50 m and the bottom of the main basin is set at an elevation of 412.25 m. This leaves a main basin depth of 2.25 m with 3:1 side slopes.

2.4 Soil Conditions

Local soils are known to be quite pervious. A previous stormwater management report, prepared by D.J. Peach and Associates Ltd. in May of 2001 for the original SWM infiltration pond (prepared in support of the original Dry Goods Warehouse (now Nut House plant) development) "conservatively" estimated a hydraulic conductivity of the soil to be 360 mm/hr ($k = 1.0 \times 10^{-2}$ cm/s) "based on past experience with similar soils".

In November 2009, a geotechnical investigation was conducted by Golder Associates on the property that also provided an estimation of the infiltration rate. A borehole was drilled in the location of the easterly portion of the existing SWM facility, two samples were taken and grain size distributions were completed for each sample.

Other than topsoil encountered in the top 0.24 m of the borehole, the remaining 5.55 m (to a depth of 408.66 m) consisted of compact to dense sand and gravel, with a trace silt, and cobbles. The geotechnical investigation states that "the estimated infiltration rate for a clean sand and gravel surface is 35 L/min/m²", which is equal to 2100 mm/hr ($k = 5.8 \times 10^{-2}$ cm/s). The relevant pages from the Golder Associates geotechnical report are provided in **Appendix B**.

The 2010 Gamsby and Mannerow Ltd (G&M) SWM Report in support of the main Phoenix plant, analyzed the stormwater management facility using the low infiltration rate, or low 'K', of 360 mm/hr, and also with the high infiltration rate, or high 'K' of 2100 mm/hr. It was found that under either condition, the SWM facility was sufficiently sized to hold and infiltrate all storm events up to and including runoff from a 1:100-year design storm event.

From the Golder Associates Geotechnical Report, groundwater levels encountered during drilling ranged from 4.4 m to 7.0 m below the ground surface. A borehole in the location of the easterly portion of the SWM facility did not encounter water and was drilled to a depth of about 408.66 mm, approximately 3.59 m below the bottom of the SWM facility.

Since the existing SWM facility was constructed and the Phoenix plan developed in 2011, the SWM Facility has continued to operate as designed. Based on visual observations during runoff events, flows rarely are seen to be conveyed the full length of the forebay before infiltrating. Pondered runoff is rarely seen in the SWM main basin, indicating the infiltration rate of the soils in the bottom of the SWM Facility are likely closer to, or higher than, the high infiltration rate. Operator observations are included in **Appendix C**.

As such, we are comfortable proceeding with the infiltration rate of 2100 mm/h ($k=5.8 \times 10^{-2}$ cm/s) for this updated modelling of the existing SWM facility.

3. DESIGN RAINFALL EVENTS

Mount Forest rainfall IDF data provided by Environment Canada was used in the appended MIDUSS model analyses to determine the expected runoff from the site under existing and post-development conditions. The two (2) closest rainfall data stations to Markdale, which are maintained by Environment Canada, are Owen Sound and Mount Forest. Markdale is located approximately equal distances to both locations. Since Mount Forest is inland from Lake Huron and Georgian Bay, much like Markdale, it was chosen as being more representative of rainfall data for the Markdale area.

The Chicago parameters and the total depth of rainfall used for the various design rainfall events are as follows:

Table 1 – Chicago Rainfall Parameters

Coefficient	5-Year	100-Year
A	1012.69	1702.25
B	8.094	9.944
C	0.820	0.827
R	0.375	0.375
Duration (min)	360	360

4. PROPOSED CONDITIONS

4.1 Proposed Development and Drainage Patterns

The proposed development includes the construction of an approximately 8,230 m² (90,000 sq. ft) addition to the existing Phoenix Building production plant and proposed associated parking and driveways.

Part of the existing northerly storm sewer system would be removed to allow construction of the building addition. A new storm sewer would be constructed to direct runoff from the parking lot areas east of the building, the rooftop of a majority of the existing Phoenix building as well as the new addition, and the asphalt area to the north of the building, to the SWM Facility. The proposed storm sewer system would be sized to convey runoff from the area during a 1:5-year design storm event and would discharge to the existing SWM facility at a point next to the existing easterly inlet. The undeveloped grassed along the east portion of the site would continue to drain by swale to the lands to the north.

4.2 Considerations for SWM Facility

According to the SWMPD Manual, in designing infiltration basins, it is typically recommended to limit the depth of stormwater ponding to no more than 0.60 m to prevent compaction of the basin bottom. However, given the fact that approximately 2-3 m of soil has been previously removed from above much of the basin bottom, that soil is generally 2.3 times heavier than water, and that water storage to that depth would be infrequent, compaction is not considered to be an issue.

A Stage-Storage-Discharge table was created to model the SWM facility and is included in **Appendix D**. While the forebay component of the SWM facility was considered to provide active storage volume, for conservative design purposes, only the main basin component of the SWM facility is considered to provide infiltration.

4.3 MIDUSS Modelling and Results

For the previous 90,000 sq. ft addition, the site was modelled as three drainage catchments that reflect the areas draining to each of the SWM facility's inlet points at its southerly and easterly ends. Catchment 100 generally represented the Phoenix plant area draining to a northerly storm sewer system, while Catchment 200 represented the Phoenix plant area draining to a southerly storm sewer system. Catchment 300 generally represented the Nut House plant area in the westerly portion of the site. The development was modelled as three (3) drainage catchments, described in **Table 2**.

Table 2 – Summary of Modelled Catchments

Catchment	Description	Area (ha)	Impervious Level (%)
100	North-easterly Area – Ex. and New Building, and Parking Area	5.51	80
200	South-easterly Area – Ex. Phoenix Building and Parking Area	4.14	90
300	Westerly Area – Nuthouse Building and Parking Area	5.96	80

The following **Table 3** summarizes the modeled inflows to the SWM facility, the depth to which water would pond in the facility, and the infiltration rate from the facility under the 1:5-year and 1:100-year design storm events. Post-development runoff modeling for the previous addition is included as **Appendix E**.

Table 3 – Summary of Results – SWM Facility

SWM Facility Design Characteristic	Design Storm Event	
	5-Year	100-Year
Combined Flow to SWM Facility (m ³ /s)	2.444	4.011
Depth of Water in SWM Facility (m)	0.84	1.39
Maximum Water Level Elevation in SWM Facility (m)	413.09	413.64
Maximum Infiltration Rate (m ³ /s)	1.305	1.336

As shown in Table 3, under the 1:100-year design storm event, the maximum depth of ponding expected in the infiltration pond is 1.39 m, or an elevation of 413.64 m, which provides a freeboard of 0.86 m to the elevation of the overflow weir of the SWM facility (414.50 m).

The currently planned 8,360 m² addition is expected to increase impervious areas by an amount like that of the previous 8,360 m² addition which, including parking areas and driving aisles, would be about 15,500 m². A 1:100-year rainfall event would reflect about 77 mm of rain, which would generate about 1,193 m³ of additional runoff. Based on the previous MIDUSS modelling and the stage-storage-discharge table planned for the SWM pond, the additional runoff volume would increase the 1:100-year design maximum high water level to about 414.00 m, which remains below the overflow elevation of 414.50 m without considering an additional exfiltration rate.

Therefore, the existing SWM facility is expected to provide sufficient capacity to store and infiltrate runoff from the subject property for proposed development conditions under design storm events up to, and including, the 1:100-year design storm event. If the detailed design determines that the existing SWM facility is too constrained, additional storage volume may be achieved with additional excavation to the existing facility.

The overflow spill weir for the SWM facility is designed to discharge to an overland flow route that would convey runoff from the SWM facility to a depressed area to the west of the subject property. This depressed area is the same location into which the Town's 1350 mm diameter trunk storm sewer outlets. It is believed that the area is essentially a percolation area for the Town's stormwater prior to spilling to the Rocky Saugeen River.

4.4 High Flow Conditions

4.4.1 On-Site Storm Sewer Systems

Since the on-site storm sewer systems are designed to convey runoff during a 1:5-year design storm event by gravity flow, runoff from more significant rainfall events would be expected to surcharge the system.

As per the March 2010 G&M SWM Report, surface ponding at the existing southerly storm sewer structures is expected to provide sufficient hydraulic head to convey the flow associated with the 1:100-year design storm event to the SWM Facility prior to spilling to neighbouring properties or reaching a parking lot ponding depth of 0.3 m.

Regarding the proposed northerly storm sewer system, for design storm events in excess of the 1:5-year return frequency, the potential exists for ponding in the easterly parking area and for runoff to spill towards the northerly portion of the subject property. A swale is proposed along the northerly boundary of the subject property to intercept the potential surcharged flows and convey them to a proposed catchbasin and ultimately to the SWM facility via the new, proposed easterly inlet.

4.4.2 Overland Flow Route for Adjacent Properties

The principle storm sewer outlet for Markdale is a 1350 mm diameter trunk storm sewer, which traverses the Chapman's property. A major storm overland flow route for Markdale also is provided across the east side of the Phoenix plant area. Grading is planned to permit surcharged flows to spill, along the paved driving areas east of the Phoenix plant, at an elevation no higher than historically has been provided. Ultimately, runoff would spill to the grassed area to the north of the proposed addition where it would disperse and drain northwesterly to the existing natural drainage route.

5. WATER QUALITY

MECP guidelines indicate that for an infiltration-type SWM facility to be implemented in the SWM of runoff from an entire site, including roads and parking lots, pre-treatment is necessary to minimize the potential for suspended sediments to "blind" the bottom of the basin and reduce its ability to provide maximum infiltration.

Since no additional level of flows is expected to drain to the oil/grit separator unit of the SWM facility than what was previously approved under the Amended Certificate of Approval as a result of proposed development, it is expected to provide sufficient pre-treatment for SWM facility inflows from the southerly inlet point.

The approximately 80 m-long forebay and 1.0 m-high stone berm components of the existing SWM facility are expected to provide adequate water quality pre-treatment of inflows from the easterly inlet point prior to discharging to the main basin of the facility.

In addition to the forebay, the stone berm with filter cloth separates the forebay from the main basin of the SWM facility, providing additional water quality treatment prior to discharging to the main basin of the facility. The stone berm filters stormwater as it is conveyed through its stone and cloth as well as reduces the velocity of the upstream inflows, allowing for improved settling of suspended solids within the forebay.

The limited amount of oils that may enter the storm sewer system from parking areas is expected to be separated and effectively contained within the oil/grit separator and the forebay for their respective inlets. If a spill were to occur anywhere on-site, the Spill Action Centre would be contacted and the spill would be contained within the collection system and the forebay, where a clean-up could occur.

Since all runoff conveyed by the storm sewer systems from the subject property runoff is expected to be infiltrated into the ground, no impairment to off-site surface water is expected.

6. SUMMARY

Chapman's proposes to construct an approximately 8,360 m² (90,000 sq. ft.) addition onto the existing Phoenix plant with associated paved parking and driving areas.

The existing SWM facility, designed as an infiltration basin, is expected to provide enough capacity to store and infiltrate runoff from the proposed development during storm events up to, and including, the 1:100-year design storm event.

Under high flow conditions such as the 1:100-year design storm runoff, some ponding is expected to occur on-site with stormwater being conveyed via the southerly storm sewer or overland flow, to the SWM facility without spilling to neighbouring properties.

Pre-treatment of runoff from the Phoenix plant areas would be provided by the forebay prior to discharging to the main portion of the SWM facility as well as the stone berm separating the forebay from the main infiltration basin.

Pre-treatment of runoff from the Nut House plant area would continue to be provided by an existing oil/grit separator prior to discharging to the SWM facility.

All of which is respectfully submitted,

GM BLUEPLAN ENGINEERING LIMITED

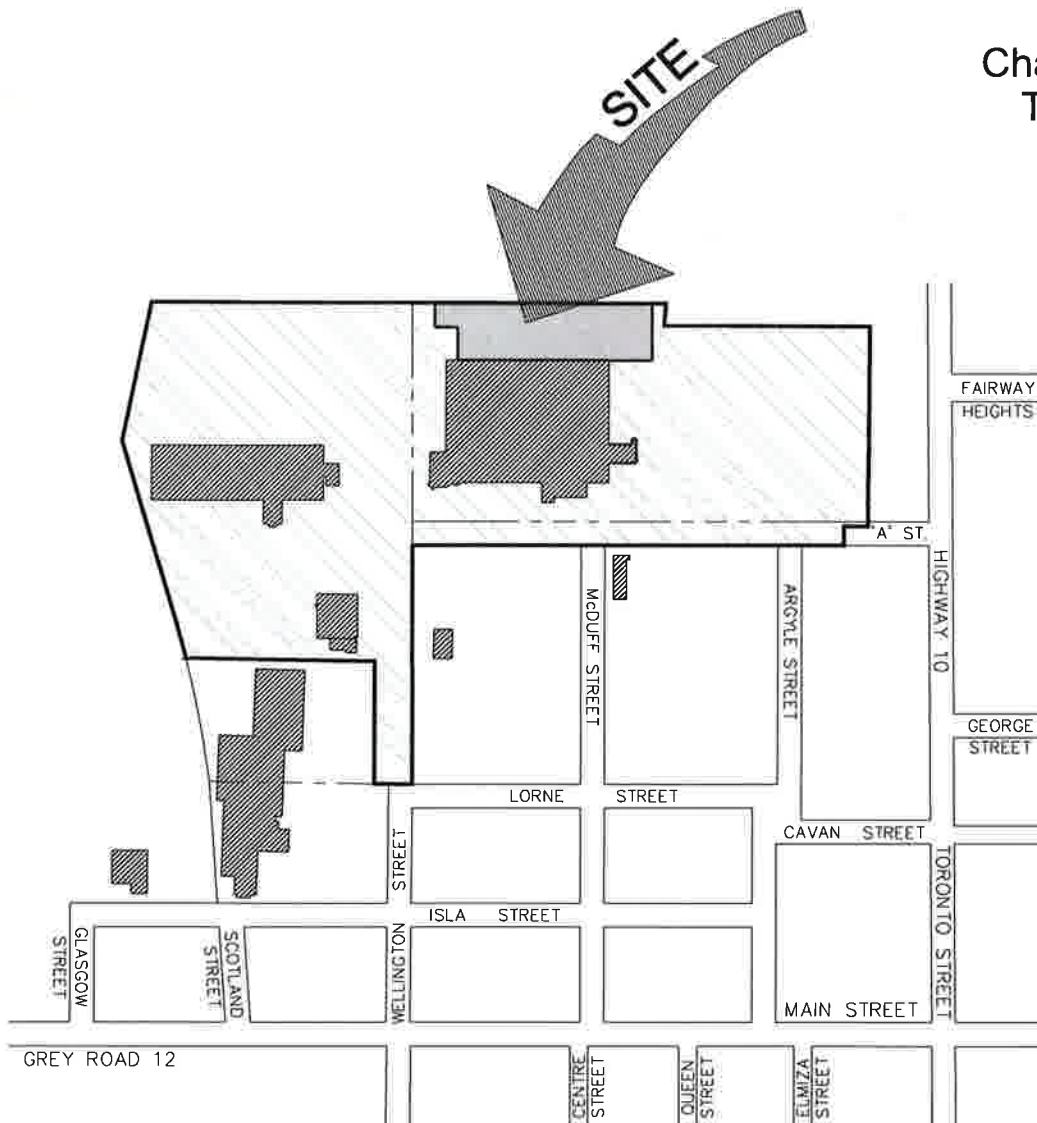
Prepared by:

A handwritten signature in blue ink, appearing to read 'John Slocombe'.

John Slocombe, P.Eng.

FIGURES:

212285
Chapman's Ice Cream
Town of Markdale



TOWN OF MARKDALE,
MUNICIPALITY OF GREY HIGHLANDS

SCALE = N.T.S.
NOVEMBER 2016

SITE LOCATION MAP

CHAPMAN'S ICE CREAM
ADDENDUM TO
SWM REPORT

Figure No. 1

212285
Chapman's Ice Cream
Town of Markdale



LEGEND

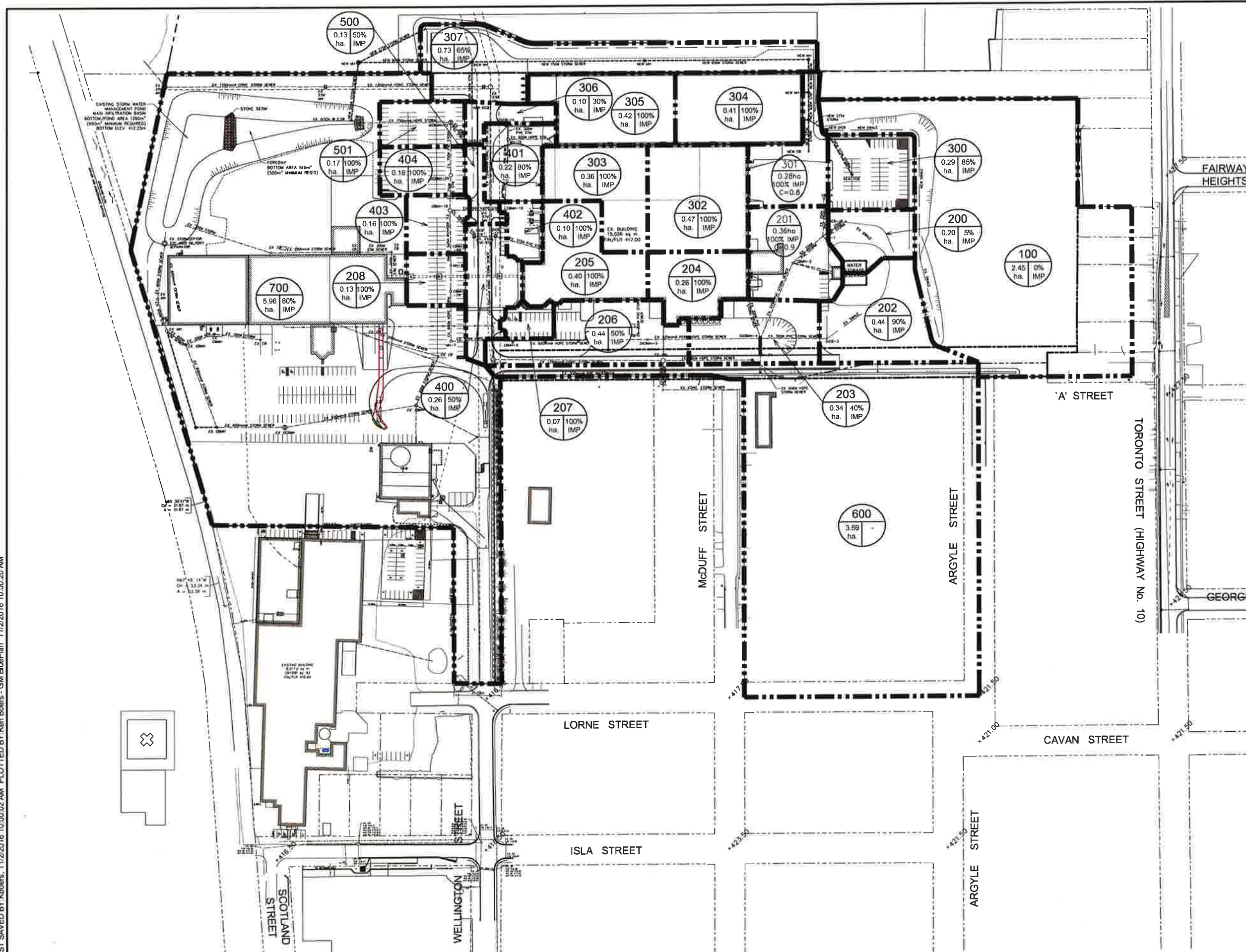
- DRAINAGE BOUNDARY
- 100 CATCHMENT NUMBER
- 2.45 0% IMPERVIOUS PERCENTAGE
- ha DRAINAGE AREA (ha.)

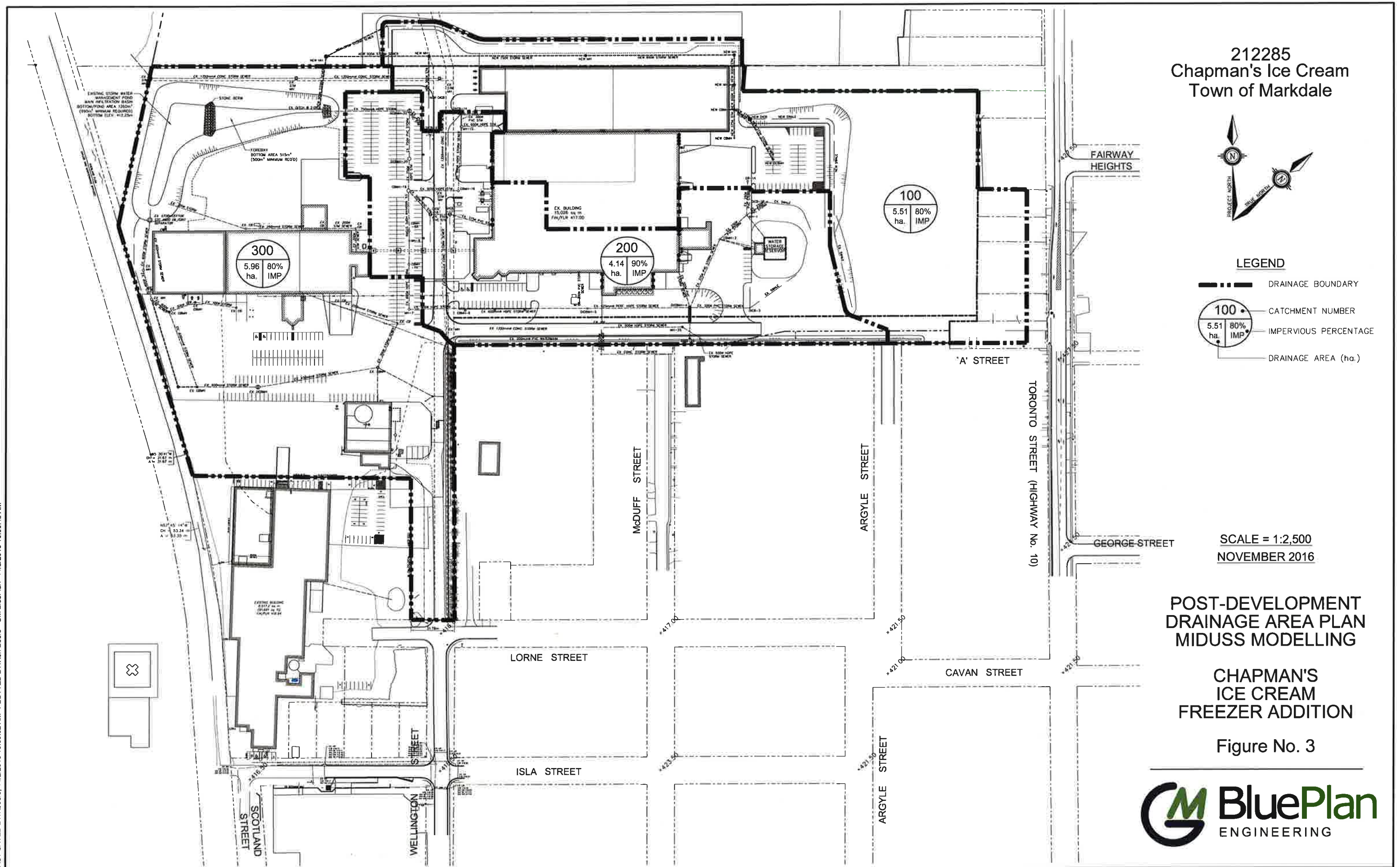
SCALE = 1:2,500
NOVEMBER 2016

POST-DEVELOPMENT
DRAINAGE AREA PLAN
STORM SEWER DESIGN

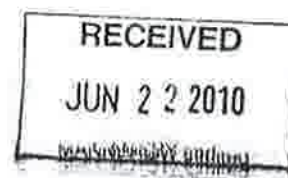
CHAPMAN'S
ICE CREAM
FREEZER ADDITION

Figure No. 2





APPENDIX A:
MOECC ECA NO. 8028-83PS3Z



209018
SWM

Ministry of the Environment
Ministère de l'Environnement

AMENDED CERTIFICATE OF APPROVAL
INDUSTRIAL SEWAGE WORKS
NUMBER 8028-83PS3Z
Issue Date: June 15, 2010

David Chapman's Ice Cream Limited
150 Lorne St Markdale
Grey Highlands, Ontario
N0C 1H0

Site Location: Chapman's Ice Cream Facility
150 Lorne St Part 2-15, Ref. Plan 16R326
Grey Highlands Municipality, County of Grey
N0C 1H0

You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:

upgrading an existing stormwater management facility to service a total drainage area of 14.57 ha (including existing developed area) with approximately 50% impervious area at the expanded Chapman's Ice Cream Limited facility located at 150 Lorne Street, Village of Markdale, Municipality of Grey Highlands. The stormwater management facility is designed to provide quality control for storm events up to 1:5 years return frequency and quantity control for storm events up to 1:100 years return frequency, discharging during major storm events through an existing municipal stormwater management facility into the Rocky Saugeen River, consisting of the following:

PROPOSED WORKS:

FOREBAY

- one (1) 25 m long grassed ditch conveying stormwater runoff from the site to a forebay described below;
- one (1) 70 m long and 1.5 m deep forebay with side slopes of 3H:1V and a bottom area of 500 m² equipped with a 1.0 m high flow check berm consisting of rip-rap, filter cloth and a 25 mm clear stone cover, providing quality control, discharging to an infiltration basin described below;

INFILTRATION BASIN

- one (1) **upgraded** infiltration basin located downstream of the oil and grit separator, providing a total stormwater holding capacity of 7540 m³ with bottom of basin dimensions of 82.5 m long, 12 m wide, bottom elevation of 412.25 m masl, 3H:1V side slopes, and a total basin depth of

2.25 m, equipped with a rip-rap protected emergency overflow structure at 415.25 m masl discharging to a drainage ditch along the CPR railroad into an existing municipal stormwater management facility; and

- including all controls and appurtenances.

all in accordance with the Application for Approval of Industrial Sewage Works submitted by Chapman's Ice Cream Limited dated August 28, 2001 and design specifications and drawings prepared by Gamsby and Mannerow Engineers, Owen Sound, Ontario, and the following additional document:

1. "Chapman's Ice Cream New Production Facility Stormwater Management Report" dated November 2009, Revised March 2010, prepared by Gamsby and Mannerow Limited, Consulting Professional Engineers, Owen Sound.
2. A letter from J. B. Solocombe, P. Eng., Gamsby and Mannerow Limited, to Stefanos Habtom, P. Eng., MOE dated May 14, 2010 providing a response to technical review comments dated May 10, 2010.

SEWAGE WORKS APPROVED UNDER CERTIFICATE OF APPROVAL No. 2261-56LKJ4 ON JANUARY 31, 2002:

a stormwater management facility to service an existing total drainage area of 4.0 ha consisting of 1.05 ha of production and office building, 1.0 ha of paved parking area, 1.55 ha of undeveloped gravel area, and 0.4 ha of grassed area, consisting of the following:

OIL AND GRIT SEPARATOR

- one (1) existing precast concrete oil and grit separator (Model # STC 4000) with an inside diameter of 3.048 meters, an oil holding capacity of 3,490 litres, a sediment holding capacity of 14,060 litres, and a 50 litres/sec maximum flow treatment capacity; designed to provide a level 1 quality treatment (up to 81% TSS removal) for stormwater flows from the 1.0 ha paved parking area and 1.55 ha of undeveloped gravel area, discharging to the south side of the infiltration basin described above;

all in accordance with the Application for Approval of Industrial Sewage Works submitted by Chapman's Ice Cream Limited dated August 28, 2001 and design specifications and drawings prepared by D. J. Peach & Associates Ltd. Durham, Ontario, and the following additional documents:

1. Letter from D.J. Peach & Associates Ltd. dated November 28, 2001 sent to Ministry of the Environment, attention S. Habtom - supplemental design brief.
2. Letter from D.J. Peach & Associates Ltd. dated December 14, 2001 sent to Ministry of the Environment, attention S. Habtom - additional design information.

3. Letter from D.J. Peach & Associates Ltd. dated January 17, 2002 sent to Ministry of the Environment, attention S. Habtom - additional design information.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

"*Certificate* " means this entire certificate of approval document, issued in accordance with Section 53 of the Ontario Water Resources Act, and includes any schedules;

"*Director* " means any *Ministry* employee appointed by the Minister pursuant to section 5 of the Ontario Water Resources Act;

"*District Manager* " means the District Manager of the Owen Sound Area Office of the *Ministry* ;

"*Ministry* " means the Ontario Ministry of the Environment;

"*Owner* " means David Chapman's Ice Cream Limited and includes its successors and assignees;

"*Proposed Works* " means the sewage works described in the *Owner* 's application, this *Certificate* and in the supporting documentation referred to herein, to the extent approved by this *Certificate* ;

"*Works* " means the sewage works described in the *Owner* 's application, this *Certificate* and in the supporting documentation referred to herein, to the extent approved by this *Certificate* .

You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL PROVISIONS

- (1) Except as otherwise provided by these Conditions, the *Owner* shall design, build, install, operate and maintain the *Works* in accordance with the description given in this *Certificate* , the application for approval of the works and the submitted supporting documents and plans and specifications as listed in this *Certificate* .
- (2) Where there is a conflict between a provision of any submitted document referred to in this *Certificate* and the Conditions of this *Certificate* , the Conditions in this *Certificate* shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

- (3) Where there is a conflict between the listed submitted documents, and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.

2. EXPIRY OF APPROVAL

The approval issued by this *Certificate* will cease to apply to those parts of the *Proposed Works* which have not been constructed within five (5) years of the date of this *Certificate* .

3. CHANGE OF OWNER

The *Owner* shall notify the *District Manager* and the *Director* , in writing, of any of the following changes within **thirty (30) days** of the change occurring:

- (a) change of *Owner* ;
- (b) change of address of the *Owner* ;
- (c) change of partners where the *Owner* is or at any time becomes a partnership, and a copy of the most recent declaration filed under the Business Names Act, R.S.O. 1990, c.B17 shall be included in the notification to the *District Manager* ; and
- (d) change of name of the corporation where the *Owner* is or at any time becomes a corporation, and a copy of the most current information filed under the Corporations Information Act, R.S.O. 1990, c. C39 shall be included in the notification to the *District Manager* .

4. OPERATION AND MAINTENANCE.

- (1) The *Owner* shall ensure that the design minimum liquid retention volume(s) is maintained at all times.
- (2) The *Owner* shall inspect the *Works* at least **once a year** and, if necessary, clean and maintain the *Works* to prevent the excessive buildup of sediments and/or vegetation.
- (3) The *Owner* shall maintain a logbook to record the results of these inspections and any cleaning and maintenance operations undertaken, and shall keep the logbook at *Owner* 's Operational Headquarters for inspection by the *Ministry* . The logbook shall include the following:
 - (a) the name of the *Works* ;
 - (b) the date and results of each inspection, maintenance and cleaning, including an

estimate of the quantity of any materials removed; and

- (c) the date of each spill within the catchment area, including follow-up actions / remedial measures undertaken.

5. RECORD KEEPING

The *Owner* shall retain for a minimum of **five (5) years** from the date of their creation, all records and information related to or resulting from the operation and maintenance activities required by this *Certificate* .

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is imposed to ensure that the *Works* are built and operated in the manner in which they were described for review and upon which approval was granted. This condition is also included to emphasize the precedence of Conditions in the *Certificate* and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review.
2. Condition 2 is included to ensure that the *Works* are constructed in a timely manner so that standards applicable at the time of Approval of the *Works* are still applicable at the time of construction, to ensure the ongoing protection of the environment
3. Condition 3 is included to ensure that the *Ministry* records are kept accurate and current with respect to approved works and to ensure that subsequent owners of the works are made aware of the certificate and continue to operate the works in compliance with it.
4. Condition 4 is included to require that the *Works* be properly operated and maintained such that the environment is protected .
5. Condition 5 is included to require that all records are retained for a sufficient time period to adequately evaluate the long-term operation and maintenance of the *Works* .

This Certificate of Approval revokes and replaces Certificate(s) of Approval No. 2261-56LKJ4 issued on January 31, 2002

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act , R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, 15th Floor
Toronto, Ontario
M5G 1B5

AND

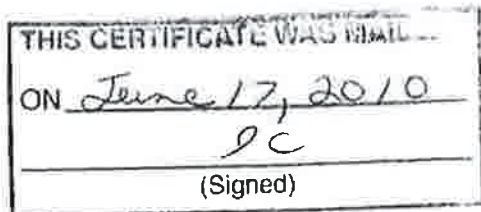
The Director
Section 53, *Ontario Water Resources Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the

Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca

The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.

DATED AT TORONTO this 15th day of June, 2010



SH/

c: District Manager, MOE Owen Sound
John Slocombe, Gamsby and Mannerow Limited ✓

Jennifer Barolet, P.Eng.
Director
Section 53, *Ontario Water Resources Act*

APPENDIX B:
EXCERPTS FROM GOLDER ASSOCIATES GEOTECHNICAL REPORT
(NOVEMBER 2009)

UPDATED FOR NEW LOCATION

November 2009

GEOTECHNICAL INVESTIGATION

Chapman's Ice Cream Plant
Markdale, Ontario

Submitted to:

Mr. Joe Jacobs, Vice President - Operations
Chapman's Ice Cream
160 Main Street West
Markdale, Ontario
N0C 1H0

Report Number: 09-1132-1058-R02

Distribution:

4 Copies - Chapman's Ice Cream
2 Copies - Benoit International Inc.
2 Copies - Golder Associates Ltd.





GEOTECHNICAL INVESTIGATION CHAPMAN'S ICE CREAM PLANT

Component	Thickness (mm)	
	Truck Routes and Parking	Automobile Parking
HL 3 Sheet Asphalt	50	40
HL 8 Binder Asphalt	60	50
Granular A Base	150	150
Granular B Subbase	400	300

Effective drainage of the granular pavement materials should be provided using stub drains at all catchbasin locations and/or full width granular construction and ditches with inverts at least 0.5 metres below the adjacent subgrade level or continuous subdrains.

The asphalt should be produced, placed and compacted in accordance with the current Ontario Provincial Standard Specifications (OPSS) for medium duty pavements. Milled notches having depths equal to the new surface asphalt thickness by 300 millimetres wide should be provided where new construction abuts existing pavements and care should be taken to properly tack coat all milled surfaces and butt joints.

Consideration should be given to utilizing concrete pavement in concentrated truck turning and loading dock areas.

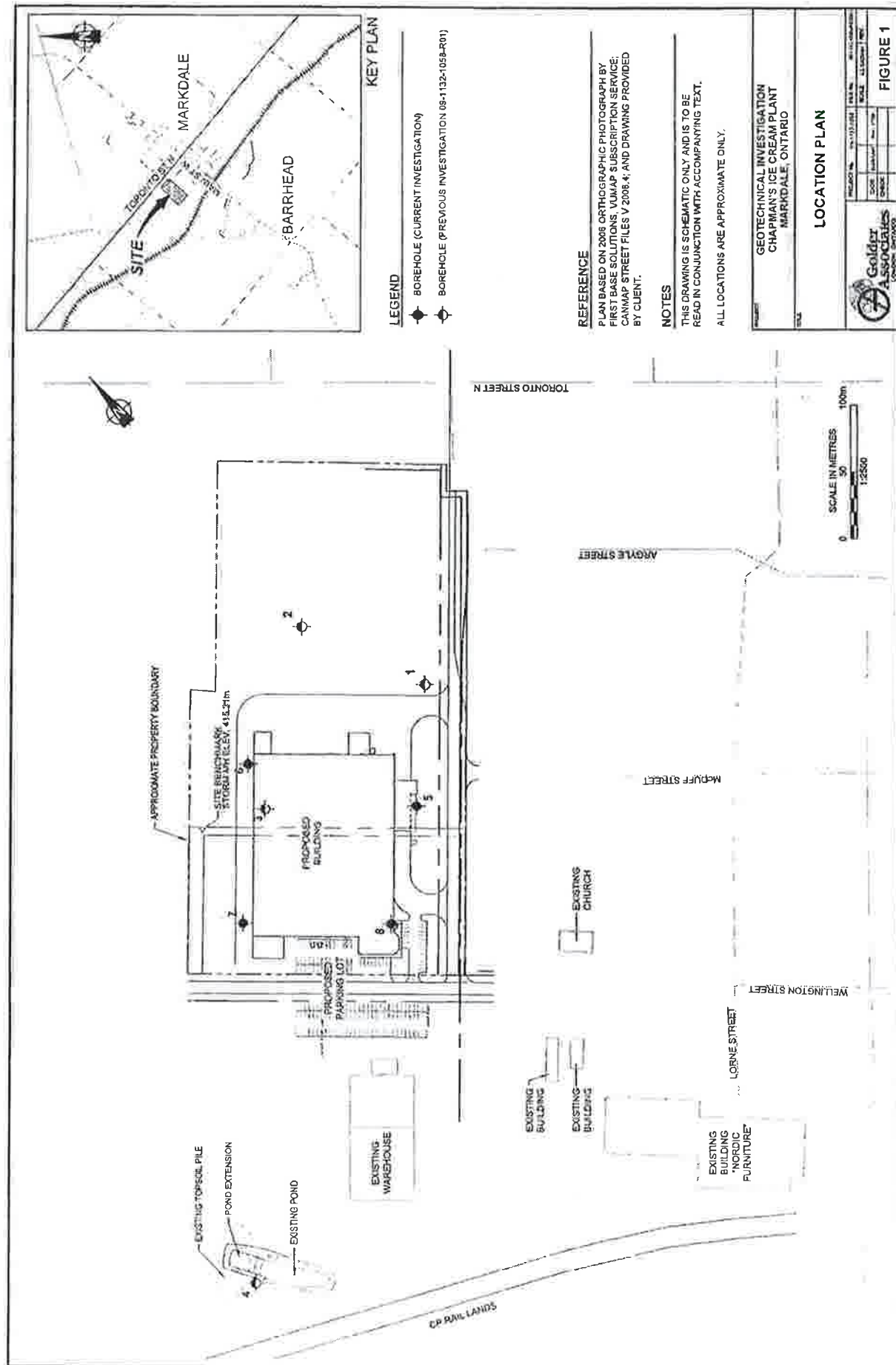
In addition, concrete pavement would be beneficial to support the trailer dolly wheels should they be parked in an area of the plant.

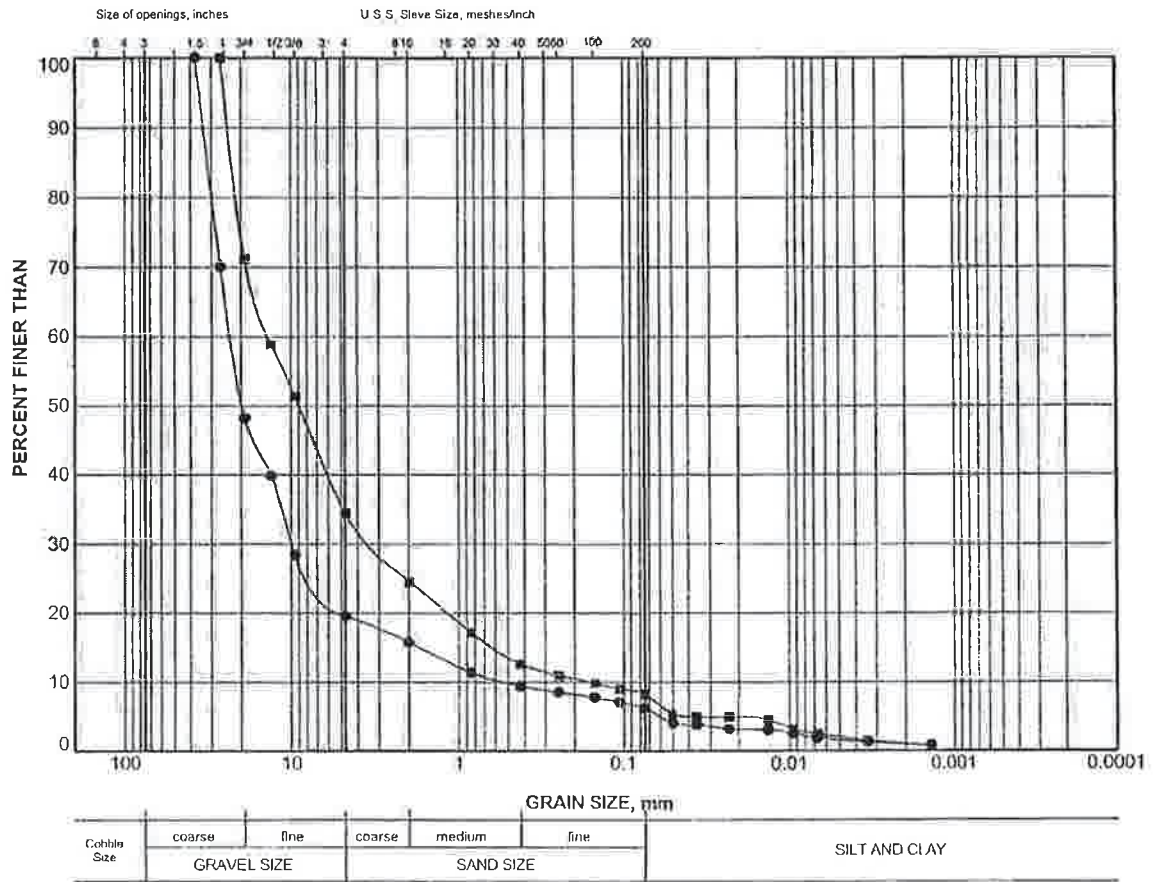
The concrete pavement should consist of a minimum of 200 millimetres of concrete and 300 millimetres of Granular A compacted to 100 per cent of standard Proctor maximum dry density.

Construction activities should be coordinated to minimize the amount of construction traffic over the exposed subgrade and partially completed pavements.

5.7 Stormwater Management Facility

It is understood that the existing stormwater pond is to be extended to the north and stormwater infiltrated into the sand and gravel layer. The estimated infiltration rate for a clean sand and gravel surface is 35 litres per minute per square metre. To maintain this rate, it is essential that the infiltration surface be kept clear of silts, debris and vegetation.





LEGEND

SYMBOL	BOREHOLE	SAMPLE	ELEV (m)
●	4	2	412.7
■	4	4	411.2

PROJECT

GEOTECHNICAL INVESTIGATION
CHAPMAN'S ICE CREAM PLANT
MARKDALE, ONTARIO

TITLE

GRAIN SIZE DISTRIBUTION SAND AND GRAVEL



**Golder
Associates**
LONDON, ONTARIO

PROJECT No	09-1132-1058	FILE No	0911321058-R020A1
DRAWN	WTF	DATE	09/10/09
CHECK		SCALE	N/A
		REV	




FIGURE A-1

APPENDIX C: SWM POND RECORDS

**EQUIPMENT MAINTENANCE
LOG BOOK**

DATE	TIME	EQUIPMENT ADJUSTMENT OR REPAIR	SIGNATURE
MAY 15/13	10:00 am	<p>Visually inspected retention pond walls, full perimeter of pond and inspected basin. No standing water. No issues with side walls.</p> <p>Removed both man hole cover to Stormceptor STC-4000 sludge judged the oil pipe location. Had 8" of silt and skin of oil on top of water column less than 1mm.</p> <p><i>Shy</i></p>	
MAY 22 14		<p>Visual inspection of retention pond, walked perimeter of pond and inspected basin. No standing water. Some minimal washing away of south side wall.</p> <p>Removed both man hole cover inspected Stormceptor. Had 8" of silt and a skin of oil on top of water column less than 1mm.</p> <p><i>Shy</i></p>	

DATE	TIME	EQUIPMENT ADJUSTMENT OR REPAIR	SIGNATURE
Apr 17/15	11:00 am	removed cover put had flow still have snow run off. Will check again in 2 weeks	CB
Aug 4/15	10:30	Visually inspected retention pond, walked perimeter of pond, inspected basin no standing water Some wash away from top of south wall Removed both manhole covers had 8" of silt and a skin of oil or less than 1mm	CB
May 14/16	1:00	Visually inspected retention pond walked perimeter of pond. some soil erosion at top of south end of pit. no standing water in basin Removed both manhole covers had 8" of silt and a skin of oil less than 1mm in water column	CB

DATE	TIME	EQUIPMENT ADJUSTMENT OR REPAIR	SIGNATURE
MAY 31/17	10:00 am	<p>Visually inspected retention pond. inspected basin no standing water. Some wash away from top of south wall. Removed man hole cover. oil present, hard to determine how much. Bob Johnson to call safety clean to suck out.</p>	
June 7/17		<p>Bob had safety clean on site. sucked oil off top then went to bottom to clean out silt and sand also with that removed 1000 gallons of water.</p>	
MAY 6/18	10 am	<p>Visually inspected retention pond. inspected basin no standing water. Some gravel wash away from south wall of top of basin. Removed man hole cover. 2" silt and minimal oil on top of water.</p>	

DATE	TIME	EQUIPMENT ADJUSTMENT OR REPAIR	SIGNATURE
June 10/19	10:30	<p>Visually inspected pond walked perimeter. No standing water some wash away of gravel on south rim</p> <p>Removed man hole covers less than 3" of silt. 1mm or less of oil in column.</p>	<p>JS</p>
MAY 2020	11am	<p>Visually inspected pond walked perimeter. No standing water. Some gravel washed down from driveway on south side.</p> <p>Remove man hole covers less than 3" of silt and less than 1mm of oil in column</p>	<p>JS</p>
June 15/2021	10:30	<p>Visually inspected pond walked perimeter. No standing water. Some water washed away south side of pond</p> <p>Removed man hole covers less than 4" of silt and less than 1mm of oil in column</p>	<p>JS</p>

APPENDIX D:
STAGE-STORAGE-DISCHARGE TABLE FOR SWM FACILITY

212285 SURFACE WATER MANAGEMENT POND DESIGN
 CHAPMANS ICE CREAM - PROJECT PHOENIX NEW MAIN PLANT
 NOVEMBER 2016

Pond Dimensions - Excluding Forebay Infiltration - Excluding Forebay

Bottom Length	82.50 m	Bottom Area =	990 sq m
Bottom Width:	12.00 m	K =	2088 mm/hr
Side Slopes:	3.00 :1	=	0.058 cm/s (High K Design)
Depth:	3.00		
Top Length:	100.50 m		
Top Width:	32.00 m		

Stage (m)	Surface Area (m ²)	Incremental Volume (m ³)	Storage Volume (m ³)	Infiltration Discharge (m ³ /s)	Overflow Discharge (m ³ /s)
412.25	1600.00	0.00	0.00	0.574	0.000
412.85	2200.00	1140.00	1140.00	0.903	0.000
413.45	3200.00	1620.00	2760.00	1.232	0.000
414.05	3800.00	2100.00	4860.00	1.561	0.000
414.50	4200.00	1800.00	6660.00	1.807	0.000
414.70	4600.00	880.00	7540.00	1.917	1.525

Note: - Infiltration pond storage volume includes the volume of the forebay.
 - Infiltration discharge rate does not include infiltration that might occur in the forebay

APPENDIX E: POST-DEVELOPMENT MIDUSS MODELLING

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212285 PostDev 5 year Nov 2016
MIDUSS Output ----->
MIDUSS version          Version 2.25 rev. 473"
MIDUSS created          Sunday, February 07, 2010"
Units used:             ie METRIC"
Job folder:              Z:\Owen Sound\212-2012\
                        212285 Phoenix Freezer Addition\SWM\2016 MIDUSS Models"
Output filename:         212285 PostDev 5 year Nov 2016.out"
Licensee name:           gmbp"
Company:                 Hewlett-Packard Company"
Date & Time last used:   11/2/2016 at 9:33:34 AM"

31  TIME PARAMETERS"
    10.000 Time Step"
    360.000 Max. Storm length"
    2400.000 Max. Hydrograph"
32  STORM Chicago storm"
    1 Chicago storm"
    1012.690 Coefficient A"
    8.094 Constant B"
    0.820 Exponent C"
    0.375 Fraction R"
    360.000 Duration"
    1.000 Time step multiplier"
    Maximum intensity 92.903 mm/hr"
    Total depth 47.813 mm"
33  6 00Shyd Hydrograph extension used in this file"
    CATCHMENT 100"
    1 Triangular SCS"
    1 Equal length"
    1 SCS method"
    100 Northeastly Area - Ex. and New Building, and Parking Area"
    80.000 % Impervious"
    5.510 Total Area"
    60.000 Flow length"
    2.000 Overland Slope"
    1.102 Pervious Area"
    60.000 Pervious length"
    2.000 Pervious slope"
    4.408 Impervious Area"
    60.000 Impervious length"
    2.000 Impervious slope"
    0.250 Pervious Manning 'n'"
    65.000 Pervious SCS Curve No."
    0.142 Pervious Runoff coefficient"
    0.100 Pervious Ia/S coefficient"
    13.677 Pervious Initial abstraction"
    0.015 Impervious Manning 'n'"
    98.000 Impervious SCS Curve No."
    0.880 Impervious Runoff coefficient"
    0.100 Impervious Ia/S coefficient"
    0.518 Impervious Initial abstraction"
    0.819 0.000 0.000 0.000 c.m/sec"
    Catchment 100 Pervious Impervious Total Area
    Surface Area 1.102 4.408 5.510 hectare"
    Time of concentration 52.073 3.542 5.430 minutes"
    Time to Centroid 260.428 171.110 174.586 minutes"
    Rainfall depth 47.813 47.813 47.813 mm"
    Rainfall volume 526.89 2107.58 2634.47 c.m"
    Rainfall losses 41.000 5.746 12.797 mm"
    Runoff depth 6.813 42.067 35.016 mm"
    Runoff volume 75.08 1854.30 1929.37 c.m"
    Runoff coefficient 0.142 0.880 0.732 "
    Maximum flow 0.010 0.819 0.819 c.m/sec"
40  HYDROGRAPH Add Runoff "

```

```

212285 PostDev 5 year Nov 2016
4  Add Runoff "
    0.819 0.819 0.000 0.000"
33  CATCHMENT 200"
    1 Triangular SCS"
    1 Equal length"
    1 SCS method"
    200 Southeastly Area - Ex. Pheonix Building and Parking Area"
    90.000 % Impervious"
    4.140 Total Area"
    40.000 Flow length"
    2.000 Overland Slope"
    0.414 Pervious Area"
    40.000 Pervious length"
    2.000 Pervious slope"
    3.726 Impervious Area"
    40.000 Impervious length"
    2.000 Impervious slope"
    0.250 Pervious Manning 'n'"
    65.000 Pervious SCS Curve No."
    0.142 Pervious Runoff coefficient"
    0.100 Pervious Ia/S coefficient"
    13.677 Pervious Initial abstraction"
    0.015 Impervious Manning 'n'"
    98.000 Impervious SCS Curve No."
    0.874 Impervious Runoff coefficient"
    0.100 Impervious Ia/S coefficient"
    0.518 Impervious Initial abstraction"
    0.721 0.819 0.000 0.000 c.m/sec"
    Catchment 200 Pervious Impervious Total Area "
    Surface Area 0.414 3.726 4.140 hectare"
    Time of concentration 40.828 2.777 3.453 minutes"
    Time to Centroid 247.189 169.835 171.211 minutes"
    Rainfall depth 47.813 47.813 47.813 mm"
    Rainfall volume 197.94 1781.49 1979.44 c.m"
    Rainfall losses 41.001 6.006 9.506 mm"
    Runoff depth 6.812 41.806 38.307 mm"
    Runoff volume 28.20 1557.70 1585.90 c.m"
    Runoff coefficient 0.142 0.874 0.801 "
    Maximum flow 0.004 0.720 0.721 c.m/sec"
40  HYDROGRAPH Add Runoff "
4  Add Runoff "
    0.721 1.540 0.000 0.000"
33  CATCHMENT 300"
    1 Triangular SCS"
    1 Equal length"
    1 SCS method"
    300 Westerly Area - Nuthouse Building and Parking Area"
    80.000 % Impervious"
    5.960 Total Area"
    50.000 Flow length"
    2.000 Overland Slope"
    1.192 Pervious Area"
    50.000 Pervious length"
    2.000 Pervious slope"
    4.768 Impervious Area"
    50.000 Impervious length"
    2.000 Impervious slope"
    0.250 Pervious Manning 'n'"
    65.000 Pervious SCS Curve No."
    0.143 Pervious Runoff coefficient"
    0.100 Pervious Ia/S coefficient"
    13.677 Pervious Initial abstraction"
    0.015 Impervious Manning 'n'"

```

```

212285 PostDev 5 year Nov 2016
98.000 Impervious SCS Curve No."
0.878 Impervious Runoff coefficient"
0.100 Impervious Ia/S coefficient"
0.518 Impervious Initial abstraction"
      0.905      1.540      0.000      0.000 c.m/sec"
      Catchment 300      Pervious      Impervious      Total Area "
      Surface Area      1.192      4.768      5.960      hectare"
      Time of concentration      46.677      3.175      4.871      minutes"
      Time to Centroid      254.110      170.446      173.709      minutes"
      Rainfall depth      47.813      47.813      47.813      mm"
      Rainfall volume      569.93      2279.70      2849.63      c.m"
      Rainfall losses      40.998      5.830      12.864      mm"
      Runoff depth      6.814      41.982      34.949      mm"
      Runoff volume      81.23      2001.71      2082.93      c.m"
      Runoff coefficient      0.143      0.878      0.731      "
      Maximum flow      0.011      0.904      0.905      c.m/sec"
40 HYDROGRAPH Add Runoff "
      4 Add Runoff "
      0.905      2.444      0.000      0.000"
54 POND DESIGN"
      2.444      Current peak flow      c.m/sec"
      0.656      Target outflow      c.m/sec"
      5598.2      Hydrograph volume      c.m"
      6.      Number of stages"
      412.250      Minimum water level      metre"
      414.700      Maximum water level      metre"
      412.250      Starting water level      metre"
      0      Keep Design Data: 1 = True; 0 = False"
      Level Discharge      Volume"
      412.250      0.5740      0.000"
      412.850      0.9030      1140.000"
      413.450      1.232      2760.000"
      414.050      1.561      4860.000"
      414.500      1.807      6660.000"
      414.700      3.442      7540.000"
      Peak outflow      1.035      c.m/sec"
      Maximum level      413.092      metre"
      Maximum storage      1792.127      c.m"
      Centroidal lag      3.276      hours"
      0.905      2.444      1.035      0.000 c.m/sec"
38 START/RE-START TOTALS 300"
      3 Runoff Totals on EXIT"
      Total Catchment area      15.610      hectare"
      Total Impervious area      12.902      hectare"
      Total % impervious      82.632%
19 EXIT"

```

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212285 PostDev 100 year Nov 2016
MIDUSS Output ----->
MIDUSS version          Version 2.25 rev. 473"
MIDUSS created          Sunday, February 07, 2010"
Units used:             ie METRIC"
Job folder:             Z:\Owen Sound\212-2012\
212285 Phoenix Freezer Addition\SWM\2016 MIDUSS Models"
Output filename:        212285 PostDev 100 year Nov 2016.out"
Licensee name:          gmbp"
Company                 Hewlett-Packard Company"
Date & Time last used:  11/2/2016 at 9:37:29 AM"

31 TIME PARAMETERS"
10.000 Time Step"
360.000 Max. Storm length"
2400.000 Max. Hydrograph"
32 STORM Chicago storm"
1 Chicago storm"
1702.250 Coefficient A"
9.944 Constant B"
0.827 Exponent C"
0.375 Fraction R"
360.000 Duration"
1.000 Time step multiplier"
Maximum intensity      141.192 mm/hr"
Total depth           76.794 mm"
33 6 100hyd Hydrograph extension used in this file"
CATCHMENT 100"
1 Triangular SCS"
1 Equal length"
1 SCS method"
100 Northeasterly Area - Ex. and New Building, and Parking Area"
80.000 % Impervious"
5.510 Total Area"
60.000 Flow length"
2.000 Overland Slope"
1.102 Pervious Area"
60.000 Pervious length"
2.000 Pervious slope"
4.408 Impervious Area"
60.000 Impervious length"
2.000 Impervious slope"
0.250 Pervious Manning 'n'"
65.000 Pervious SCS Curve No."
0.259 Pervious Runoff coefficient"
0.100 Pervious Ia/S coefficient"
13.677 Pervious Initial abstraction"
0.015 Impervious Manning 'n'"
98.000 Impervious SCS Curve No."
0.914 Impervious Runoff coefficient"
0.100 Impervious Ia/S coefficient"
0.518 Impervious Initial abstraction"
1.346 0.000 0.000 0.000 c.m/sec"
Catchment 100 Pervious Impervious Total Area "
Surface Area 1.102 4.408 5.510 hectare"
Time of concentration 30.296 2.959 4.768 minutes"
Time to Centroid 229.484 168.169 172.227 minutes"
Rainfall depth 76.794 76.794 76.794 mm"
Rainfall volume 846.27 3385.07 4231.34 c.m"
Rainfall losses 56.886 6.576 16.638 mm"
Runoff depth 19.908 70.218 60.156 mm"
Runoff volume 219.38 3095.20 3314.58 c.m"
Runoff coefficient 0.259 0.914 0.783 "
Maximum flow 0.042 1.340 1.346 c.m/sec"
40 HYDROGRAPH Add Runoff "

```

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212285 PostDev 100 year Nov 2016
4 Add Runoff "
1.346 1.346 0.000 0.000"
33 CATCHMENT 200"
1 Triangular SCS"
1 Equal length"
1 SCS method"
200 Southeasterly Area - Ex. Pheonix Building and Parking Area"
90.000 % Impervious"
4.140 Total Area"
40.000 Flow length"
2.000 Overland Slope"
0.414 Pervious Area"
40.000 Pervious length"
2.000 Pervious slope"
3.726 Impervious Area"
40.000 Impervious length"
2.000 Impervious slope"
0.250 Pervious Manning 'n'"
65.000 Pervious SCS Curve No."
0.259 Pervious Runoff coefficient"
0.100 Pervious Ia/S coefficient"
13.677 Pervious Initial abstraction"
0.015 Impervious Manning 'n'"
98.000 Impervious SCS Curve No."
0.906 Impervious Runoff coefficient"
0.100 Impervious Ia/S coefficient"
0.518 Impervious Initial abstraction"
1.179 1.346 0.000 0.000 c.m/sec"
Catchment 200 Pervious Impervious Total Area "
Surface Area 0.414 3.726 4.140 hectare"
Time of concentration 23.754 2.320 2.979 minutes"
Time to Centroid 221.040 167.393 169.043 minutes"
Rainfall depth 76.794 76.794 76.794 mm"
Rainfall volume 317.93 2861.34 3179.26 c.m"
Rainfall losses 56.924 7.190 12.163 mm"
Runoff depth 19.869 69.604 64.631 mm"
Runoff volume 82.26 2593.45 2675.71 c.m"
Runoff coefficient 0.259 0.906 0.842 "
Maximum flow 0.017 1.176 1.179 c.m/sec"
40 HYDROGRAPH Add Runoff "
4 Add Runoff "
1.179 2.526 0.000 0.000"
33 CATCHMENT 300"
1 Triangular SCS"
1 Equal length"
1 SCS method"
300 Westerly Area - Nuthouse Building and Parking Area"
80.000 % Impervious"
5.960 Total Area"
50.000 Flow length"
2.000 Overland Slope"
1.192 Pervious Area"
50.000 Pervious length"
2.000 Pervious slope"
4.768 Impervious Area"
50.000 Impervious length"
2.000 Impervious slope"
0.250 Pervious Manning 'n'"
65.000 Pervious SCS Curve No."
0.259 Pervious Runoff coefficient"
0.100 Pervious Ia/S coefficient"
13.677 Pervious Initial abstraction"
0.015 Impervious Manning 'n'"

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212285 PostDev 100 year Nov 2016
98.000 Impervious SCS Curve No."
0.912 Impervious Runoff coefficient"
0.100 Impervious Ia/S coefficient"
0.518 Impervious Initial abstraction"
1.485 2.526 0.000 0.000 c.m/sec"
Catchment 300 Pervious Impervious Total Area "
Surface Area 1.192 4.768 5.960 hectare"
Time of concentration 27.157 2.652 4.276 minutes"
Time to Centroid 225.457 167.792 171.613 minutes"
Rainfall depth 76.794 76.794 76.794 mm"
Rainfall volume 915.38 3661.53 4576.91 c.m"
Rainfall losses 56.918 6.770 16.800 mm"
Runoff depth 19.875 70.024 59.994 mm"
Runoff volume 236.91 3338.73 3575.64 c.m"
Runoff coefficient 0.259 0.912 0.781 "
Maximum flow 0.048 1.477 1.485 c.m/sec"
40 HYDROGRAPH Add Runoff "
4 Add Runoff "
1.485 4.011 0.000 0.000"
54 POND DESIGN"
4.011 Current peak flow c.m/sec"
0.656 Target outflow c.m/sec"
9565.9 Hydrograph volume c.m"
6. Number of stages"
412.250 Minimum water level metre"
414.700 Maximum water level metre"
412.250 Starting water level metre"
0 Keep Design Data: i = True; 0 = False"
Level Discharge Volume"
412.250 0.5740 0.000"
412.850 0.9030 1140.000"
413.450 1.232 2760.000"
414.050 1.561 4860.000"
414.500 1.807 6660.000"
414.700 3.442 7540.000"
Peak outflow 1.336 c.m/sec"
Maximum level 413.639 metre"
Maximum storage 3422.421 c.m"
Centroidal lag 3.358 hours"
1.485 4.011 1.336 0.000 c.m/sec"
38 START/RE-START TOTALS 300"
3 Runoff Totals on EXIT"
Total Catchment area 15.610 hectare"
Total Impervious area 12.902 hectare"
Total % impervious 82.652"
19 EXIT"

```