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December 7, 2009
Stantec File: 62602732

Distribution via courier to recipients listed below:

Attention: **Ms. Kathy Pounder, Niagara Escarpment Commission (NEC)**
Mr. Chris Hibberd, Nottawasaga Valley Conservation Authority (NVCA)
Mr. Andy Sorensen, Grey Sauble Conservation Authority (GSCA)
Mr. Craig Laing, Ontario Ministry of Natural Resources (MNR)
Ms. Chunmei Liu, Ontario Ministry of the Environment (MOE)
Mr. Bryan MacKell, County of Simcoe
Mr. Randy Scherzer, County of Grey
Mr. Jim Uram, Township of Clearview
Mr. Jake Linklater, Saugeen Ojibway First Nations

To all recipients:

Reference: **Walker Aggregates Inc.**
Duntroon Quarry Expansion
Adaptive Management Plan (AMP)
Draft for Discussion (December 7, 2009)

On behalf of Walker Aggregates Inc., we are submitting for review the latest draft of the Adaptive Management Plan (AMP) for the proposed Duntroon Quarry Expansion. This draft includes Walker Aggregates' responses to comments received on earlier drafts, and represents the next step in the process of developing an AMP that will meet the needs of stakeholders, while still allowing for efficient implementation through the ARA licensing process.

We look forward to working with representatives of the agencies and organizations listed above, who are stakeholders in the continued evolution of this "living document".

We will be contacting each of the agencies copied on this letter shortly to arrange meetings to discuss the enclosed document and how it can continue to be improved, so it reflects both agencies' regulatory responsibilities and Walker Aggregates' business responsibilities.

Distribution of hard copies as follows:

5 – Niagara Escarpment Commission (NEC)
2 – Nottawasaga Valley Conservation Authority (NVCA)
1 – Grey Sauble Conservation Authority (GSCA)
2 – Ontario Ministry of Natural Resources (MNR)
2 – Ontario Ministry of the Environment (MOE)
2 – County of Simcoe
2 – County of Grey
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December 7, 2009

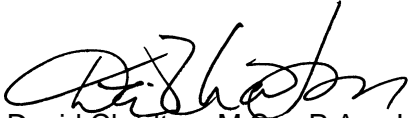
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**Reference: Walker Aggregates Inc.
Duntroon Quarry Expansion
Adaptive Management Plan (AMP)
Draft for Discussion (December 7, 2009)**

Please do not hesitate to contact us should you require anything further.

Sincerely,

STANTEC CONSULTING LTD.



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Att: AMP report document

c.c. Walker Aggregates Inc.



**ADAPTIVE MANAGEMENT PLAN (AMP)
Duntroon Quarry Expansion
Aggregate Resources Act Application
Lot 25 and Pt. Lot 26, Concession 11
Township of Clearview**

Prepared for:
Walker Aggregates Inc.

Prepared by:
Stantec Consulting Ltd.
Jagger Hims, division of Genivar
Consultants Limited Partnership



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Distribution:

5 – NEC
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First Nation

Stantec File: 62602732
Jagger Hims File: 04-930521.52
Date: December 7, 2009

**ADAPTIVE MANAGEMENT PLAN (AMP)
DUNTROON QUARRY EXPANSION
AGGREGATE RESOURCES ACT APPLICATION
LOT 25 AND PT. LOT 26, CONCESSION 11
TOWNSHIP OF CLEARVIEW**

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1.0 Introduction

The Duntroon Quarry has been in operation on County Road 91 in Clearview Township, in the County of Simcoe Ontario for approximately 40 years. Since 1995 the quarry has been operated by Walker Aggregates Inc., a wholly owned subsidiary of Walker Industries Holdings Ltd. (Walker Aggregates).

The high quality limestone produced from this quarry is in demand as building material and also for use in agricultural, recreational and environmental projects. As a result, Walker is seeking to expand the Duntroon Quarry operation across the road to a new parcel of property.

The proposed Duntroon Quarry Licence Expansion¹ is intended to continue producing valuable limestone, continue Walker Aggregates' role as a key local employer and corporate citizen, and to raise the bar in the aggregate industry with a proposal that respects area neighbours and results in a net environmental gain.

Walker's environmental objective is to leave the site ecologically better than its current condition. This will be accomplished through numerous environmental enhancements and an Adaptive Management Plan to ensure that protection, mitigation, and enhancement measures will sustain local environmental resources and functions for future generations.

The Adaptive Management Plan (AMP) presented here is based on an established process that has been applied to both public and private undertakings. It is a practical implementation of the precautionary principle in the form of a rigorous process to reduce uncertainty and improve the ability for Walker Aggregates to respond to ecological and environmental changes over the life of the project. The Walker AMP is a formal and systematic tool that includes publicly available annual reports and updates every five years, and opportunities for government agencies, community organizations and Aboriginal communities to review and provide input to continuously improve the AMP.

The Walker AMP is a living document and a public document. As a living document it will evolve and improve over time through implementation, dialogue and continuous learning about the management of local ecological resources. As a public document it will be subject to input from Annual Operations Improvement Workshops and publicly accessible information that will encourage interested organizations and individuals to take part in evolving the AMP.

¹ The location of the existing Duntroon Quarry and the proposed licence expansion property is illustrated on Figure 1. The figure also shows the locations of the unopened Osprey Quarry Licence Property, as well as the proposed MAQ Highland Quarry property

1.1 THE WALKER AMP IN CONTEXT: QUARRY MANAGEMENT AND THE ENVIRONMENT

The Walker AMP works in conjunction with the quarry management plan, including all the associated environmental components of that plan. The quarry management plan is laid out in the following reports and plans prepared for the licence expansion:

- The ARA Site Plans (MHBC, 2009);
- Reports that address groundwater and surface water (Jagger Hims 2005; 2007a; and 2007b); and
- Reports that address the natural environment (Stantec, 2005 and 2007).

Together with the Walker AMP, these documents comprise thorough and effective guidance for Walker Aggregates to operate the quarry while mitigating environmental impacts and ensuring that environmental enhancements result in net environmental gain. These documents are based on proven approaches and nearly 50 years of aggregate operations in the specific environment surrounding the proposed expansion. The quarry management plan as proposed is based on modeling assumptions and the knowledge and insights of Walker Aggregates, that have proven effective over many years of application.

The Walker AMP is a tool that Walker Aggregates will use to fine tune these proven techniques in an integrated quarry monitoring/mitigation system. The AMP maximizes environmental protection by recognizing the interconnections and influences that create feedback loops between the quarry operation and the environment. The Walker AMP includes a program of short and long term monitoring that will help to guide Walker Aggregates to identify if, and when, additional mitigation measures are needed and when mitigation measures should be adapted to changing environmental conditions.

The quarry operation is part of a complex natural system, and the Walker AMP reflects this. The quarry will be part of the evolving environment and the environment is part of the evolving quarry operations. It is a complex system of interactions that Walker Aggregates will monitor, analyze and use to continually learn, adapt, improve and respond based on environmental performance indicators. The AMP continues as a guide for Walker Aggregates for the entire life of the quarry through to closure and rehabilitation. Obligations under the AMP are completed only when there are no longer any potential impacts arising from the quarry and the Aggregate Resources Act (ARA) licence is surrendered.

1.2 CATEGORY 1 AMP COMPONENTS

The major components of the AMP that relate to the ongoing operation of the quarry are related to water dynamics and include the following:

1. Environmental baseline;
2. Groundwater, surface water and conceptual model;
3. The proposed quarry operational plan (including rehabilitation and closure);
4. Performance Indicator Trigger Monitoring (PITM); and
5. Long-term trend monitoring:
 - a) Groundwater and surface water monitoring;
 - b) Ecological monitoring.

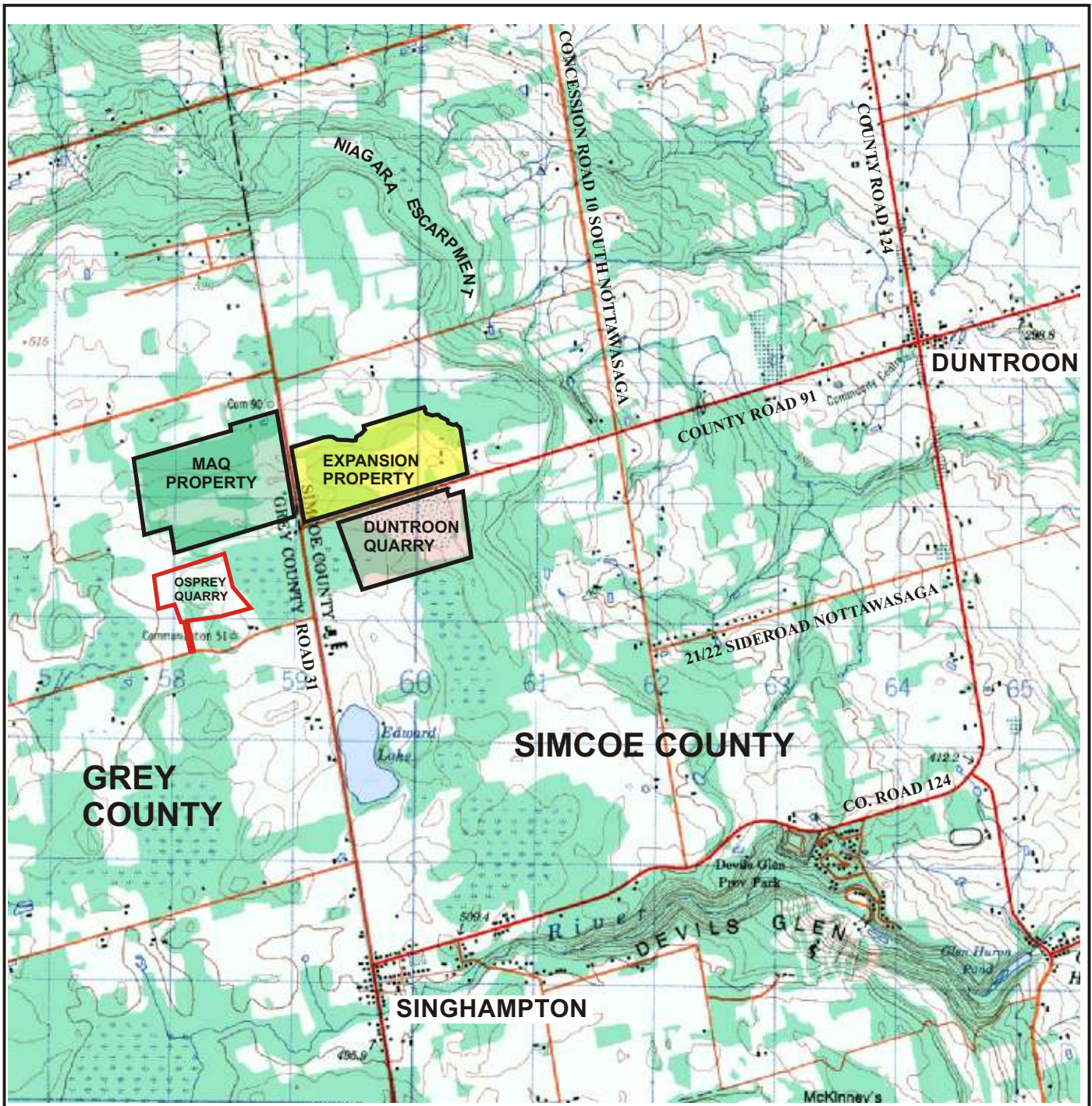
These components interact and influence each other either directly or indirectly in response to how water is managed in the quarry and general climatic conditions.

1.3 CATEGORY 2 AMP COMPONENTS





Category 2 components do not interact with the day to day water management in the quarry and are not related to the operational plan. These are independent mitigation measures such as reforestation of lands outside the influence of the quarry water management activities. These activities are independent of what goes on inside the quarry and will not benefit from, or be harmed by, changes to quarry activities. They include:

1. Ecological Enhancement and Mitigation Measures
2. Ecological Enhancement and Mitigation Monitoring

The Category 2 AMP requirements are to make sure the mitigation measures are properly implemented (e.g. appropriate number and species of trees are planted) and that resulting features are managed in adaptation with changing conditions and trends (e.g. replanting for dead trees, controlling pest damage, controlling/allowing public access, etc).



LEGEND

-  QUARRY EXPANSION
-  LICENSED BUT UNDEVELOPED OSPREY QUARRY PROPERTY
-  EXISTING DUNTROON QUARRY
-  MAQ HIGHLAND QUARRY PROPERTY

0 1 km



Map Reference:
1:50,000 NTS sheet 41A/8, Collingwood.

LOCATION MAP

DUNTROON QUARRY EXPANSION APPLICATION
ADAPTIVE MANAGEMENT PLAN
For Walker Aggregates Inc.



| |
|---------------------------|
| DATE: NOVEMBER 2009 |
| PROJECT: 4-930521.52 |
| SCALE: 1:50000 |
| REF. NO.: 4-93052152F1-LM |

FIGURE **1**

**ADAPTIVE MANAGEMENT PLAN (AMP)
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2.0 AMP – Continual Improvement

The development of the AMP began with comprehensive, multi-year (2002 to 2009) studies and the experience of Walker Aggregates to determine the environmental baseline conditions on and around the expansion area. This understanding of current baseline conditions was then used to develop a conceptual model of the groundwater and surface water systems and the ways in which the water systems interact with ecological features (such as wetlands) and resource use (such as domestic wells).

The AMP will be a tool to enable Walker Aggregates to continually improve and update the conceptual model of the environmental conditions so that operations and management are always based on the best available information. **Figure 2** is a depiction of the continual improvement cycle that will ensure the Walker AMP stays relevant and effective as time passes.

The operational plan for the proposed expansion was developed based on the baseline conditions and the conceptual model combined with the experience gained from the existing quarry operations reports and the knowledge of Walker Aggregates. The operational plan has been designed to minimize effects on the groundwater and surface water systems, and to protect valued ecological features and resource uses in the surrounding landscape.

The proposed monitoring programs were then developed through extensive discussions and workshops among agencies, consultants and Walker Aggregates, and are based on an analysis of the data collected about the baseline conditions, the conceptual model and the proposed operational plan. There are four component monitoring plans included in the AMP, and each is designed to answer an important AMP question:

1. **Performance Indicator Trigger Monitoring:**
Is the operational plan being implemented as designed and are performance indicators being met?
2. **Long-term Trend Groundwater and Surface Water Monitoring Plan and**
3. **Long-term Trend Ecological Monitoring Plan:**
Is the long term maintenance of water dynamics at the performance trigger levels having the desired effect of protecting ecological features and human uses?
4. **Ecological Enhancement and Mitigation Monitoring Plan:**
Have the proposed enhancements been properly implemented and managed?

If the answer to any of these questions is 'no', the management practices will need to be adapted to achieve a 'yes' answer.

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The data from these monitoring programs are analyzed and the results communicated across disciplines to help Walker Aggregates to determine what steps need to be taken to adapt, learn from and apply the information. As the monitoring programs are conducted over the life of the quarry, the information will be used by Walker Aggregates to continually refine understanding of baseline conditions and the conceptual hydrologic model, and adapt the operations (both long-term and short-term) and the monitoring programs. The cycle of refinement continues for the life of the quarry through rehabilitation and closure.

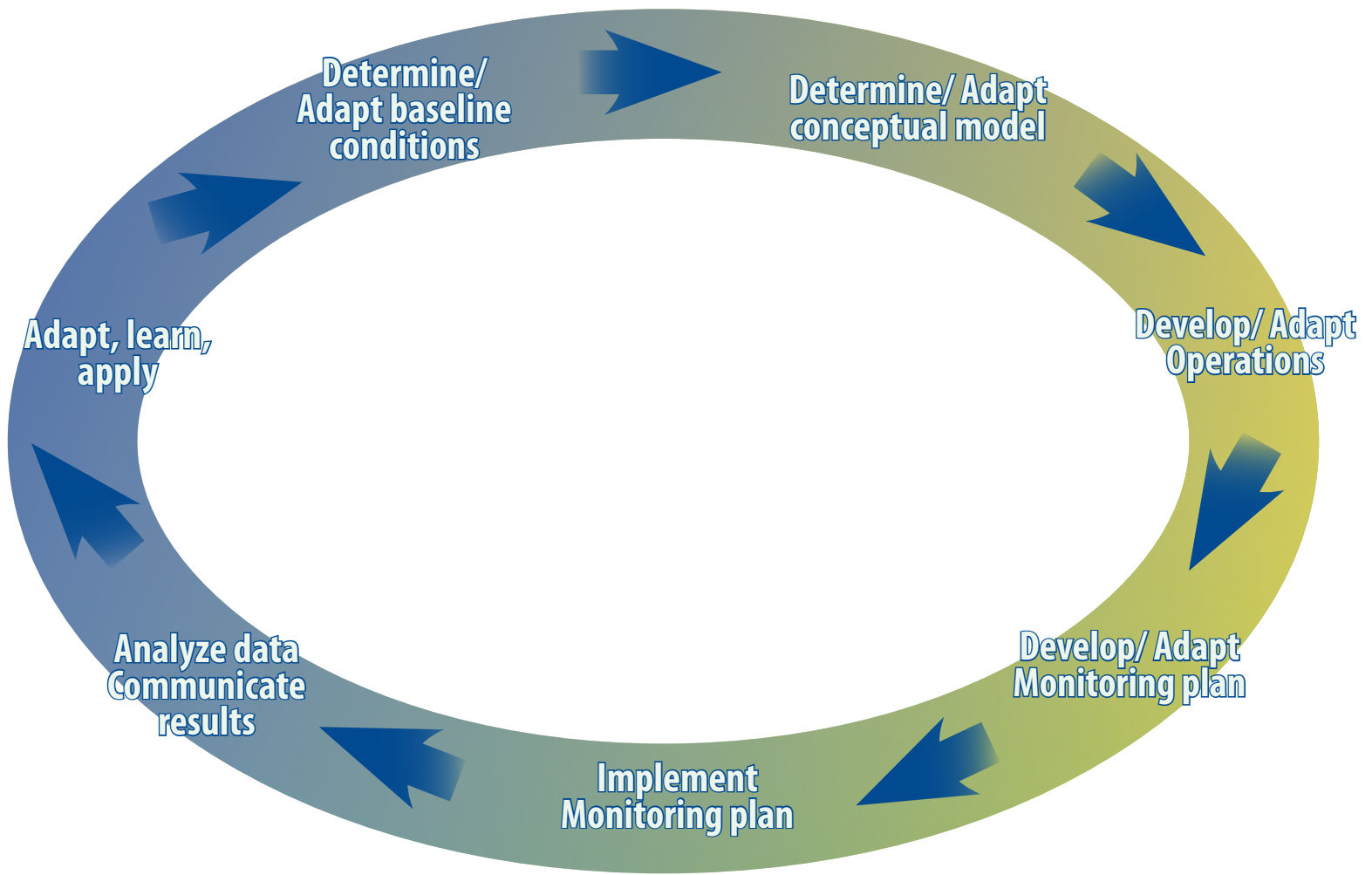


Figure 2: Adaptive Management Plan Means Continual Improvement

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3.0 AMP Components

3.1 CATEGORY 1

3.1.1 Environmental Baseline

The environmental baseline is outlined in the following reports prepared in support of the Aggregate Resources Act application:

1. The ARA Proposed Site Plans – Existing Features (MHBC, 2009);
2. Duntroon Quarry Expansion Geological Report and Level 2 Hydrogeological Assessment (Jagger Hims, September 2005);
3. Level 2 Hydrogeological Assessment Addendum Cumulative Impact Assessment Proposed Expansion and Proposed MAQ Highland Quarry Computer Groundwater Modelling Response to Agency Review Comments (Jagger Hims, October 2007);
4. Duntroon Quarry Expansion Ground and Surface Water Monitoring Program Addendum (Jagger Hims, October 2007);
5. Karst Investigation of the Duntroon Quarry Expansion Lands (Karst Solutions and Worthington Groundwater, October 3, 2007);
6. Duntroon License Expansion – Level 2 Natural Environment Technical Report (Stantec, October 7, 2005); and
7. Duntroon License Expansion – Level 2 Natural Environment Report Technical Report Addendum: Response to Agency Comments and Cumulative Effects Assessment (Stantec, October 2007).

Baseline monitoring is continuing and the information being gathered will be analyzed and assessed in order to update the environmental baseline once the quarry licence is granted, and at points of significant change in quarry operations, at a min every five years following license granting until quarry closure. The updated environmental baseline conditions will be documented in the Five Year Environmental Baseline Update and AMP Report.

3.1.2 Groundwater and Conceptual Model

Details of the Groundwater model for the proposed Duntroon Quarry Expansion can be found in Appendix F of Duntroon Quarry Expansion Geological Report and Level 2 Hydrogeological Assessment, prepared by Jagger Hims and dated September 2005. The model was subsequently modified to incorporate the hydrogeological information collected by MAQ Aggregates Inc. A cumulative impact assessment of both proposed quarry operations was completed in the 'Level 2 Hydrogeological Assessment Addendum Cumulative Impact Assessment Proposed Expansion and Proposed MAQ Highland Quarry Computer Groundwater

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Modelling Response to Agency Review Comments' (Jagger Hims, October 2007). The updated model structure and input parameters may be found in Appendix A of that report. Appendix B of the Addendum report includes the calibration of the model to existing conditions.

The factual field investigation information, the knowledge and experience of Walker Aggregates, discussions with area landowners, and the resulting groundwater model provide the basis for our understanding of the natural system, linking groundwater and surface water flows to ecological features and functions (wetlands and fish habitat) and human uses (domestic wells and springs). This conceptual understanding of the natural system is the basis for establishing performance indicator targets to protect ecological functions and human uses.

3.1.3 Operational Plan

The Operational Plan is set out in the Aggregate Resource Act (ARA) Site Plans Operational Plan (Sheet 2 of 4). The proposed rehabilitation of the quarry is illustrated in the Rehabilitation Plan (Sheet 3 of 4). The Operational Plan covers the period from initial quarry development through rehabilitation and closure. The Operational Plan is further described in the Planning Report and Aggregate Resources Act Summary Statement (MHBC, September 2005).

The Operational Plan has been prepared in accordance with the ARA Provincial Standards Manual. It sets out the measures required to prepare the site for extraction and identifies the sequence of quarry operations. Further, it provides direction to Walker Aggregates on the timing for rehabilitation and deals with implementation of appropriate mitigation to manage potential social and environmental impacts.

The proposed Duntroon Quarry Expansion includes a licenced area of approximately 76.7 ha or 189.5 acres. Extraction activities are proposed for approximately 64.8 ha or 160 acres. The difference between the two land areas includes the regulatory setbacks as required under the Aggregate Resources Act, and the area around the American Hart's Tongue Fern colony in the western part of the property. The Operational Plan identifies the various phases of extraction that will be undertaken, as well as the area of the Butternut Trees and associated set-back in the existing woodlot, the extraction of which will only occur if, and when, one or more specific criteria are met, as defined in the Site Plan notes (MHBC, 2009).

The proposal is to extract the dolostone rock from above and below the water table, down to a general elevation of 500 metres above sea level (m asl) around the west, north and east perimeters, and down to 490 m asl in the south-central part of the site. Pumping of water that accumulates in the excavation as a result of direct precipitation and surface water run off, as well as from groundwater inflow through the rock, will be required in order to maintain dry working conditions across the quarry floor. A component of that water will be required for aggregate processing operations and for seasonal dust control, road cleaning and irrigation of

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landscaped areas, as occurs at the existing quarry. A water management system has been developed to provide sufficient water for operations, and excess water will be discharged off-site at strategic locations to maintain seasonal flow patterns in the wetland features and surface watercourses around the quarry, including the springs at the Niagara Escarpment to the east.

There are approximately 41 million tonnes of recoverable aggregate resource within the proposed limit of extraction, assuming vertical perimeter extraction faces. Based on an expected average extraction rate of 1.5 million tonnes per year, the life expectancy of the quarry will be about 27 years.

The extraction operation is to be completed in phases, designated as 1, 2A, 2B and 3, down to elevation 500 m, commencing in the south central part of the property, and then moving in a clockwise direction. The last phase (Phase 3) to be extracted will be along the north-central and then eastern section of the quarry down to elevation 500 m asl, followed by final extraction of the rock beneath Phase 1 down to a final elevation 490 m asl, as shown on the cross-sections on the site plans.

The overall objective of the design of the quarry is to maximize recovery of the high quality aggregate resource while maintaining the environmental integrity and functions of the surrounding lands, and minimize environmental impact on local groundwater, surface water and wetland resources.

Once extraction has been completed in the quarry expansion and all the plant and equipment have been removed, dewatering operations will cease and the quarry will be allowed to progressively fill with water up to its natural equilibrium level over the ensuing several tens of years. Seasonal discharge of quarry water to the natural heritage features to maintain the required hydroperiods and flows, and the AMP program, will be continued through this rehabilitation period. These components will continue until the final equilibrium lake level has been achieved, and it is demonstrated through monitoring that the natural heritage features are self-sustaining.

3.1.4 Operations Mitigation

Operations mitigation activities are part of planned quarry activities to manage and mitigate environmental impacts arising from the day to day quarry operation. Examples include pumping and distributing excess water from the quarry to off-site locations, and maintaining and managing buffers to adjacent natural areas. These quarry management activities are an expected and ongoing process during the life of the quarry. These are the environmental conditions and planned operational management and mitigation measures in place at the time the aggregate license is issued. Environmental conditions around the quarry will change over time due to natural ecological processes with or without the presence of a quarry. Operational

management and mitigation measures may change over time in response to the changing natural environmental conditions, but not necessarily.

3.1.5 Performance Indicator Trigger Monitoring (PITM)

Performance Indicator Trigger Monitoring (PITM) is designed to protect the natural heritage ecological features and functions and human uses of water that are present around the expansion property. This protection will extend during active extraction phases of the quarry through to final rehabilitation as a lake. The performance indicator trigger monitoring includes predetermined targets for water levels in sensitive features. The targets include early warning (yellow zone) and action threshold (red zone) trigger values. The early warning and action threshold values have been set to ensure that Walker Aggregates has adequate warning to implement timely adaptation of the quarry operations. Adaptations will be based on immediate and measurable effects of the operations on:

- Surface water temperature and flow; and
- Wetlands water levels.

The Performance Indicator Trigger Monitoring program is detailed in **Appendix A** of this Adaptive Management Plan.

3.1.6 Long Term Trend Monitoring

3.1.6.1 Ground and Surface Water Monitoring

The Groundwater and Surface Water Long-term Trend Monitoring will be used to track and evaluate the seasonal and year over year responses of the ground and surface water systems in the vicinity of the quarry as quarry operations progress. The information will provide background and scientific assessment to assist Walker Aggregates to:

- Integrate current monitoring data with the long term trend ecological monitoring program;
- Detect long term changes in the site environment that may be related to quarry operations;
- Detect long term changes in the environment that may result from other factors;
- Update the environmental baseline;
- Identify climate trends;
- Provide feedback for applying necessary mitigation measures;
- Provide feedback to adapt the quarry operations;
- Assess the long term effectiveness of the performance indicators specified in the Performance Indicator Trigger Monitoring Program;

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- Adapt the Performance Indicator Trigger Monitoring Program; and
- Adapt the Long-term Trend Monitoring Program.

The Long-term Trend Groundwater and Surface Water Monitoring program is detailed in **Appendix B** of this Adaptive Management Plan.

3.1.6.2 Ecological Monitoring Plan

The purpose of the Long-term Trend Ecological Monitoring Plan is to enable Walker Aggregates to supplement the information from the long term water monitoring program with information about the health and functioning of the natural heritage features in the vicinity of the proposed expansion. The information from the Long-term Trend Ecological Monitoring Plan will be used by Walker Aggregates to:

- Integrate with the long term trend groundwater and surface water monitoring program;
- Detect long term changes in the environment and assess whether they are quarry related or as a result of other factors;
- Update the environmental baseline;
- Identify climate trends;
- Provide feedback to adapt the quarry operations and mitigation;
- Assess the long-term effectiveness of the performance indicators specified in the Performance Indicator Trigger Monitoring Program;
- Adapt the Performance Indicator Trigger Monitoring Program; and
- Adapt the Long-term Trend Monitoring Program.

The Long-term Trend Ecological Monitoring Program is detailed in **Appendix C** of this Adaptive Management Plan.

3.2 CATEGORY 2

3.2.1 Ecological Enhancement and Mitigation Measures

The Ecological Enhancement and Mitigation Measures are described in Section 6.3 of the 'Duntroon License Expansion – Level 2 Natural Environmental Technical Report' (Stantec, 2005) and in the 'Reforestation Planting Plan' (Stantec, 2009). A single dug farm pond known as the Millar Cow Pond was subject to further investigation and review, following agency consultation. As a result of the investigations, a pond relocation plan was designed as a rehabilitation and enhancement measure, as presented in the technical letter to Walker Aggregates from Stantec Consulting Ltd., dated Feb. 27, 2009 (subject line "Duntroon Licence

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Expansion – Millar Pond Relocation”). The enhancement and mitigation measures addressed in this AMP include:

- The Reforestation Planting Plan; and
- The Millar Cow Pond relocation.
- Butternut trees that are currently assessed as “retainable” are located in proposed phase 2B.

3.2.2 Ecological Enhancement and Mitigation Monitoring

The Ecological Enhancement and Mitigation Monitoring Program has been developed to enable Walker Aggregates to monitor the success of the proposed ecological enhancement and mitigation measures. It sets goals and identifies performance standards and measurement for Walker Aggregates to assess the success of the enhancement and mitigation measures. It establishes a system for Walker Aggregates to actively monitor progress toward meeting established goals and identifies actions to be taken to adapt the plan in the event that the enhancements are not progressing toward one or more of the goals as expected.

Details of the Ecological Enhancement and Mitigation Monitoring Plan are included in **Appendix D**.

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4.0 AMP Component Interactions and Influences

Each component of the Walker AMP is part of an integrated system of interactions and influences. The components of the AMP cross scientific disciplines (i.e., groundwater, surface water and ecology). The structure of the AMP creates a system of monitoring and adaptation that combines the promotion of conservation of biodiversity and ecosystem health with the economic development of a quarry expansion.

The components of the AMP are influenced by factors outside the proposed quarry operation such as climate change, population growth and land-use changes. Climate and natural ecological dynamics will influence the environmental baseline over time. Ecological features and processes that are part of the environmental baseline may also influence the climate.

Figure 3 illustrates the interactions and influences between each AMP component.

The operations plan for the proposed quarry has been designed based on a thorough understanding of current ecological conditions (the environmental baseline). Specific components of the quarry design and operations are targeted at maintaining natural dynamics in the environmental conditions.

The predictive groundwater model has been developed by considering the existing environmental baseline and the operations of both the Duntroon Quarry Expansion and MAQ Highland Quarry (see **Section 7.0** of this report for additional details). As the quarries' operations progress, the model will be modified using information received from the long term monitoring programs. The long term monitoring programs include climate information, and the environmental baseline may be adapted to reflect climatic trends.

The performance indicator trigger monitoring program includes measures to mitigate short term influences that the quarry may have on the water and ecological systems in the vicinity of the quarry. When an indicator is triggered it may result in a shift in mitigation or a temporary cessation of certain quarry operations.

The long term trend monitoring reports will assess the effectiveness of the performance indicator trigger monitoring and make recommendations for fine-tuning that program. The long term trend monitoring program is used to gather information, analyze the data and draw conclusions about the influence of quarry operations on the water system and natural heritage features in the vicinity of the proposed expansion. It is also used to assess the influence of climate and other factors on the features and functions of those systems. The long term trend monitoring will enable Walker Aggregates to make recommendations on mitigation measures to be implemented and changes that may need to be made to quarry operations. If mitigation measures are required, they will influence the long term monitoring that is required for the quarry. Mitigation measures may also result in a change to quarry operations.

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The ecological enhancement and mitigation program has been developed as a result of the initial operational plan affecting specific natural heritage features. The purpose of the monitoring program is to enable Walker Aggregates to monitor the success of the ecological enhancement program and take steps to mitigate any shortfalls, should the performance goals not be achieved.

Figure 4 is a schematic illustration of the major AMP components and how they relate to each other over time. This is a generalized “big picture” view to show the main overlap and interaction. Additional details on the duration and frequency of each of the specific monitoring components are presented in **Appendices A** through **D**. As shown on this figure, monitoring programs will be coordinated with quarry phases and management actions. For example, long term ecological monitoring and PIT monitoring will start when the quarry first extends below the water table, as this is the first point at which quarry operations could have an impact on ecological features through alteration of groundwater dynamics. Enhancement monitoring begins as soon as the enhancements are implemented and continues until the established goals have been met. Long-term water monitoring continues throughout the life of the quarry and rehabilitation phase.

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| | | | | | | | | | |
|----------------------------|---|--|---|--|--|-------------------|------------------------|-------------------|--------------|
| Baseline | every 5 years after 2002 and/or at * | | * | | * | | * | | |
| Long Term Water | Continuously | | | | | | | | |
| PIT | | Continuously | | | | | | | |
| Long Term Ecology | | | | 2 years then once every 5 years and/or at start of new phase | | | | | |
| Forest Enhancement | | Plant Year 1 - 3 , monitor survival annually to Year 5 , monitor target performance every 5 years until targets met | | | | | | | |
| Millar Cow Pond Relocation | | Create new pond Year 3 , monitor survival to Year 5 , monitor target performance every 5 years until targets met, and/or at start of phase 3 | | | | | | | |
| Butternut | | According to butternut management plan | | | | | | | |
| Quarry Phase | Application Process | License Granted | Phase 1 | | Phase 2 | | Phase 3 | | Lake Filling |
| | | | Above water table | Below water table | Above water table | Below water table | Above water table | Below water table | |
| Management Actions | Apply for butternut permits; Prepare info for PTTW; | Obtain PTTW; Plant enhanced forest areas; Create pond enhancements, Obtain butternut permits | Initiate pumping to RR2 and ANSI wetlands | | Initiate pumping to SW2 and RR6; Cut Butternuts Phase 2B | | Remove Miller Cow Pond | | |

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Figure No.

4.0

Title

Schematic Timelines for Duntroon Quarry AMP Components
AMP Component Appropriate Time Lines

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5.0 Regulatory Framework

The Walker Adaptive Management Plan is implemented under the Aggregate Resources Act (ARA), as detailed notes are provided on the ARA Site Plans, which bind the operator to undertake the performance indicator trigger monitoring compliance evaluation requirements contained in the AMP. The ARA provides an effective enforcement mechanism, as non-compliance with the requirements of the ARA Site Plan can lead to the ARA licence being suspended or revoked.

The Walker Adaptive Management Plan will be a condition of the ARA licence, and details of the AMP may need to be modified over the course of time in response to monitoring results. Following a one-window approach, it is proposed that the Ministry of Natural Resources be designated as the lead agency with respect to reviewing and approving modifications of the AMP, in consultation with the Ministry of the Environment and the Conservation Authorities. This approach is consistent with past practices and allows each agency to focus on its mandate without losing sight of the big picture.

The performance indicator trigger monitoring program will be undertaken by the quarry operator with regular reporting (details in **Section 6.0** of this report) to the Ministry of Natural Resources as the lead agency, and to the Ministry of Environment and the Conservation Authorities, as appropriate. Commentary on the effectiveness of the AMP and the need for any modifications will be part of such reporting as required by the ARA licence. In this regard, it is anticipated that making modifications to the content of the AMP will not require an accompanying amendment to the ARA Site Plans from MNR, or to the Permit To Take Water (PTTW) or Certificate of Approval from MOE.

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6.0 Coordinated Reporting

6.1 MONITORING REPORTS

One of the strengths of this AMP approach to the monitoring of quarry operations and related impacts is that all of the results of the individual component monitoring programs will be incorporated into a single monitoring report document. The report for each component program will form a separate Appendix, which will document the results of the monitoring that was completed for that program during the previous year.

Schedule

As outlined in **Table 4**, the results of the individual monitoring programs will be summarized in a coordinated AMP Summary Report, which will be issued each year, and will include:

- Integration of all of the information to provide a comprehensive annual 'report card' with respect to the operations of the quarry;
- Documentation of the monitoring that was done and the results;
- Comparison of monitoring results to the established performance indicator triggers;
- Documentation of mitigation that was undertaken and the results of that mitigation;
- Documentation of investigations into changes that were not related to the Duntroon Quarry Expansion;
- Recommendations for modifying performance indicator triggers and/or mitigation as, and if, required;
- Recommendations for modifying the Adaptive Management Plan,,and
- A summary of the overall state of the Environment (water resources, associated natural heritage features and environmental enhancements) surrounding the quarry operations.

Figure 4 is a summary of the AMP monitoring program by component. It identifies when each component of the monitoring will commence and the frequency of reporting on each component.

The full AMP Summary Report will be submitted to MNR for review as the lead agency for the AMP by April 30 of each year. Other agencies will receive copies of the report as directed by MNR. Since the AMP will likely be a condition of the Permit To Take Water and the Certificate of Approval for Discharge for the Duntroon Quarry Expansion, the full report will also be submitted to MOE in compliance with the reporting requirements of those permits. The full report will be posted to the website that has been established by Walker Aggregates Inc. for the Duntroon Quarry Expansion.

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As part of their commitment to working with the community, Walker holds an Annual Operations Improvement Workshop for neighbours and other interested stakeholders. The AMP Summary Report (including the 5 Year Comprehensive Review Report discussed below) will be an agenda item at each of these workshops. This will provide an organizing framework for the discussions, and will give the stakeholders who choose to be involved in the Workshops an opportunity to ask questions about the AMP, make suggestions for improvement to the process and generally gain a better understanding of how the process can be used to provide continuous improvement in the operation of the quarry.

The AMP Summary Report will include discussion and recommendations regarding:

- Ongoing integration of the long term trend ground and surface water monitoring program with the long term trend ecological monitoring;
- Whether long term changes in the site environment are occurring that may be related to quarry operations;
- Whether long term changes in the regional environment are occurring and whether they are quarry related or as a result of other factors;
- Updating the environmental baseline for both site environment and regional environment;
- The implication of any climate trends and adaptations that may be required as a result to any of the AMP components;
- Applying necessary mitigation measures;
- Adapting the quarry operations
- The degree of protection that the performance indicators specified in the Performance Indicator Trigger (PIT) Monitoring Program offer to the protected resources and uses; and
- Adapting the performance indicator trigger monitoring program; and
- Adapting the long-term trend monitoring program.

6.2 5 YEAR COMPREHENSIVE REVIEW REPORT

A Comprehensive Review Report will be completed on a five year cycle. The 5 Year Comprehensive Review Report is a more comprehensive version of the AMP summary report discussed above. It will be used to assess the effectiveness of the water management activities and the mitigation measures that have been implemented during the previous 5 year period; and, the overall quarry operations with respect to the state of well-being of the surrounding natural environment. The observed impacts from quarry operations on the adjacent groundwater and surface water resources will be compared against the predictions from the groundwater model.

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The additional surface and subsurface information collected during the preceding five years will be incorporated into the model which will be re-calibrated to the then-current existing conditions. The model will be used to run future extraction scenarios, to provide refinement of future impact predictions and will assess the need for additional mitigation measures that may be required.

The 5 Year Comprehensive Review Report will also be used to assess the effectiveness of the Adaptive Management Plan including the Performance Indicator Trigger Monitoring program. The appropriateness of the monitoring program will be assessed with respect to the parameters being monitored, the locations being monitored and the values that have been set for the early warning (yellow zone) and the action threshold (red zone) trigger values. Recommendations to modify specific components of the AMP will be provided for discussion with the MNR and the other agencies. The 5 Year Comprehensive Review Report will be posted to the Walker website for access by other interested parties.

6.3 UPDATING OF THE AMP

As noted previously, the Adaptive Management Plan and the associated quarry operations will be subject to review, update and modification, as appropriate. Review will occur:

- When base line data collection is complete
- When review is recommended by the long term monitoring reports
- After completion of an investigation under the PIT monitoring (if recommended): and
- As part of a regular 5 year comprehensive review cycle.

The AMP updates will be submitted to MNR for review as the lead agency for the AMP and posted on the website that has been established by Walker Aggregates Inc. for the Duntroon Quarry Expansion.

6.4 SUMMARY

In summary, the AMP monitoring and associated reporting program will provide regular access to following data, analysis and reports:

- Monitoring data that will be posted to the Walker web-site as they are collected to enable ongoing access by regulatory agency staff and other interested parties;
- An annual AMP Summary Report that includes Performance Indicator Trigger monitoring results; routine long-term groundwater / surface water monitoring results; and ecological monitoring results;

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- Early warning of potential negative impacts to feature or function, with sufficient time to investigate and implement mitigation measures as appropriate;
- A 5 Year Comprehensive Review Report that will include a comparison of monitoring results to model predictions; updates and recalibrations of the groundwater model to reflect new information; and updated impact predictions to help guide and plan future quarry operations;
- A 5 Year Comprehensive Review Report with recommendations regarding the effectiveness of the overall AMP, specific trigger levels, monitoring results, mitigation methods and quarry operations. The report will be reviewed with MNR, MOE and Conservation Authority staff and modifications to improve the AMP, where appropriate, will be discussed with, and implemented through, MNR;
- An up to date AMP that evolves with the information gathered overtime.

This process will ensure protection of water resources and associated significant natural heritage features and functions throughout the active life of the quarry through to final rehabilitation of the property.

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7.0 Integration with Proposed MAQ Highland Quarry

MAQ Aggregates Inc. is proceeding with an Aggregate Resources Act application for a Class A licence for a Category 2 Quarry on property in the Municipality of Grey Highlands in Grey County, immediately to the west of Grey Road 31 and the Walker Aggregates Inc. proposed Duntroon Quarry expansion property. That quarry, to be known as the MAQ Highland Quarry if approved, will be permitted to extract the Amabel Formation dolostone rock resource from above and below the water table.

The Duntroon Quarry expansion application and the MAQ Highland Quarry application have been prepared as stand-alone applications. Both applications are supported by respective individual and cumulative impact assessment reports documents that take full account of the potential presence of the other quarry operation. Field investigation results and groundwater / surface water monitoring data for each quarry property were made available to the consultants working for each operator for incorporation into their respective technical study reports.

Each application includes a separate cumulative impact assessment of the two quarry operations on the ground water, surface water and natural heritage features and functions in the area. Those assessments conclude that extraction of the rock resource as proposed at each location individually and cumulatively can be completed without negative impacts to the surrounding natural environment. Final rehabilitation plans for the existing Duntroon Quarry and its proposed expansion, and the MAQ Highland Quarry include lakes within the extraction areas that will help to sustain the groundwater, surface water and natural heritage features around the quarry properties once quarrying is complete.

The groundwater and surface water monitoring program for the Duntroon Quarry will be integrated into the AMP and routine monitoring programs for the proposed expansion. The MAQ Highland Quarry will have its own site specific AMP and associated monitoring programs. Each quarry operator will be responsible for completing and reporting their own individual AMP compliance monitoring programs as conditions of their ARA licences and Permits To Take Water and Certificates of Approval for off-site discharge of excess quarry water.

However, since the two proposed quarry operations will be located adjacent to each other, and the individual AMPs include areas of monitoring and compliance overlap, there is an agreement between the two operators that monitoring data will be shared on a routine basis. Operators of both quarries, as well as the agencies and the public, will have access to the expanded monitoring database for incorporation into their annual evaluation and reporting of monitoring results. In addition, both operators have developed a protocol for the investigation and resolution of individual water well interference complaints and non-compliance with AMP targets in the event that any occur in the future. That protocol includes the following:

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- Both operators will be responsible for completing their own AMP monitoring and long-term trend monitoring programs. Where there is overlap at monitoring stations that are common to both operators, each operator will complete the monitoring at different times during the monitoring period to maximize the data coverage that is collected.
- Monitoring data from locations that are common to both operators will be shared between the operators.
- Both operators will inform the other within 24 hours of receiving a water supply interference complaint or receiving data that indicate an AMP performance indicator early warning (yellow zone) or action trigger (red zone) occurrence.
- Walker Aggregates Inc. will be responsible for investigating and reporting upon water supply interference complaints located to the east of Grey Road 31.
- MAQ Aggregates Inc. will be responsible for investigating and reporting upon water supply interference complaints located to the west of Grey Road 31.
- Both operators will be responsible for investigating and reporting upon their own AMP warning and trigger occurrences, and that information will be shared with the other operator.
- In the event that an AMP warning or trigger is shown by one operator to be the result of operations by the other operator (to the satisfaction of both operators), the causal operator shall be responsible for implementing appropriate mitigative measures.
- In the event that there is disagreement between the two operators with respect to the cause of an AMP warning or trigger, the matter shall be arbitrated by the Ministry of Natural Resources (MNR), in consultation with the Ministry of the Environment and the Conservation Authority. Should MNR request an independent third-party peer review to resolve the matter, the cost of that review shall be borne equally by the two operators. The decision of the MNR shall be final.

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8.0 Operations Adaptation and Mitigation

A variety of measures that can be implemented in a step wise, or progressive, approach are available to the quarry operator to mitigate quarry-related water impacts. These measures will ensure that local water resources and the associated natural heritage features and functions are protected throughout the active life of the quarry and through the rehabilitation period. These mitigation measures are discussed in the quarry application documents (Jagger Hims, 2005, 2007a and 2007b; and Stantec, 2005 and 2007), and include standard measures that are expected to be part of the ongoing day to day operation of the quarry, and contingency measures that can be used if the standard measures fail to achieve desired results.

Standard measures include:

- Discharging excess quarry water from dewatering sump or storage reservoir into a specific wetland feature or pond feature to maintain vernal pooling hydroperiod and/or general soil moisture content conditions in wetland; and
- Discharging excess quarry water into karst bedrock infiltration areas between quarry extraction area and brow of Escarpment to recharge the dolostone aquifer to maintain groundwater discharge springs at Escarpment.

Contingency measures that can be implemented by Walker Aggregates, if the AMP indicates such to be necessary, include:

- Use of deeper, cooler water from quarry sump or storage reservoir if water temperature is a concern at Escarpment springs.
- Controlling the outflow of surface water from a specific wetland feature to maintain vernal pooling / hydroperiod and/or general soil moisture conditions.
- Direct discharge of excess quarry water from sump or storage reservoir into surface watercourse to supplement flow or lower temperature, if needed.
- Recharge of dolostone bedrock using one or more recharge injection wells to maintain flow conditions at Escarpment springs and/or to maintain residential water supplies at downgradient locations.
- Deepening or replacement of residential water supplies in the event that well yields are adversely affected.
- Provision of alternate water supply in the event that residential well yield is adversely affected.
- Move the extraction operation to a location that is above the water table (if available) and/or away from the area of concern until conditions return to acceptable.
- Cease extraction until conditions return to acceptable in the area of concern.

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