

Appendix B

Historic Reports

**Taro Aggregates Ltd.
Proposed East Quarry Landfill
Environmental Assessment**

**Executive
Summary**

January 1995

*Note: This Executive Summary has been reproduced from Volume I
of Taro's Proposed East Quarry Environmental Assessment
(January 1995)*

TARO

AGGREGATES LTD.

The Honourable B. Wildman
Minister of Environment and Energy
Minister's Office
135 St. Clair Avenue, 12th Floor
Toronto, Ontario
M4V 1P5

January 26, 1995

Dear Minister:

Re: Taro Aggregates Ltd. East Quarry Environmental Assessment

We are pleased to submit for your review the Environmental Assessment of our proposal to continue our existing landfilling operations in our East Quarry. The Environmental Assessment which is attached reflects the work of many people over the period of several years and concludes that the proposed landfill can be built and operated in a safe and environmentally sound manner and reflects the preferred alternatives from among the various alternatives studied.

You may be interested to know that our Environmental Assessment was undertaken with the assistance of a community-based Study Group. The Study Group consists of eleven persons, seven volunteer residents of the local community, the Operations Manager for the City of Stoney Creek, the Supervisor of Solid Waste Operations for the Region of Hamilton-Wentworth, the General Manager of Taro, and the Environmental Assessment Coordinator of Philip Environmental. The Study Group met generally once a month for two and one half years in public sessions and made important decisions about the assessment. Staff of the Ministry of Environment and Energy regularly attend as resource persons and we are grateful for their help.

Taro Aggregates Ltd. is an Ontario corporation carrying on business in the City of Stoney Creek. The company's business activities consist of landfilling solid non-hazardous industrial, commercial and institutional waste in its West Quarry, manufacturing asphalt on its lands adjacent to the West Quarry, and quarrying crushed stone to make aggregate in its adjacent East Quarry. Taro is a subsidiary of Philip Environmental Inc.. We believe Philip Environmental is well known to your Ministry as Philip carries on an integrated resource recovery and waste management business in the Region of Hamilton-Wentworth as well as other places in Ontario and has a sound reputation for its recycling and resource recovery activities. The Philip group of companies now recycles or reuses over 40% of all materials handled by the group and this percentage is increasing.

The purpose of our proposed undertaking is to establish and operate a landfill site in the Taro East Quarry in order that Taro can continue its existing landfill business and continue to respond to the opportunity it has to meet the needs of its customers in the Hamilton-Wentworth Region who require disposal service for solid non-hazardous industrial, commercial and institutional waste, including the residue of waste brought into Hamilton for recycling and processing by Philip Environmental Inc.. The purpose of the Undertaking is also to enable Taro to continue to assist Philip Environmental Inc. in sustaining Philip's integrated waste management, recycling and reuse business in the Region of Hamilton-Wentworth by providing this disposal service.

A PHILIP ENVIRONMENTAL COMPANY



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Minister of Environment and Energy

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This Environmental Assessment has benefitted significantly from the serious involvement of the volunteer members of the Study Group who are residents of the local community. They have provided clear guidance to our technical experts, assisted in the definition of alternatives, developed criteria to assess the alternatives which reflected the public interest, requested and obtained technical work beyond the scope originally planned by the company, and requested and obtained funding from the company for independent peer review of the company's technical work.

The community members of the Study Group have not yet completed their work and have not yet stated a conclusion on whether or not to support our application for approval. At the present time they are considering the final results of their peer review and on a without prejudice basis, negotiating with the company on issues relating to community compensation and investment and terms and conditions of operations. In the Environmental Assessment, Taro has put forward its position on these matters and we will continue to inform your Ministry of the results of the negotiations as they progress. Taro has provided the community members of the Study Group with funding and they have retained independent legal counsel to assist the community members in their negotiations with the company on these issues.

The City of Stoney Creek is our host community. The City has also retained independent legal counsel and technical experts to consider the Environmental Assessment. We anticipate that the community members of the Study Group may wish to consider the results of that work by the City and Region as well as their own peer review before communicating their final position on the negotiations and the Environmental Assessment. We anticipate these activities will be completed before the completion of the review of the Environmental Assessment by your normal agency reviewers and that the results will be available for your consideration concurrently with the results of the reviews by Ministries and Agencies.

The timing of your decision on this matter is very important to us. Our West Quarry landfill will be filled by the summer of this year. For this reason, we have taken every opportunity to build into our planning process consideration of the public interest and protection for the community as well as the concerns and suggestions of a wide range of members of the community received through a very extensive public participation program. This program included conventional public meetings, the open Study Group meetings, wide distribution of newsletters, routine publication of news articles in the local newspaper, three major public opinion research studies, door-to-door interviews with adjacent neighbours and questionnaires of the nearby neighbourhood. We are hopeful that the negotiations with the community members of the Study Group and with the City of Stoney Creek can be concluded shortly and we have worked hard to integrate the concerns of the public with this Environmental Assessment so that you may be able to approve it without a hearing and in time for our company to provide continuity of service to meet the needs for IC&I waste disposal of our customers after the closure of the West Quarry landfill.

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We have received and are very grateful for the excellent cooperation of your staff and that of the government agencies during 1994 in a prompt review of our draft Environmental Assessment. We are particularly grateful to the EA Branch staff who provided advice and guidance including attending at evening meetings in the City of Stoney Creek, and to the Approvals Branch who expeditiously coordinated the technical reviews of our draft.

We believe that the attached final Environmental Assessment fully responds to the comments, concerns and suggestions of the agencies who reviewed our draft Environmental Assessment and we sincerely hope that you will be able to approve this Environmental Assessment in time for construction to start in mid-1995. Apart from resolving the issue of continuity of Taro's service for the IC&I waste needs of the Region of Hamilton-Wentworth and Taro's support of the integrated resource recovery and waste management activities of Philip Environmental, very substantial capital works are involved in the first stages of the proposed landfill and these works and the employment they generate will make a significant contribution to the economic well being of our community.

A complete list of all reports supporting the EA is attached as Schedule A. The required maps are attached as Schedules B and C. Appropriate *Environmental Protection Act* and *Ontario Water Resources Act* applications will be submitted directly to the Approvals Branch.

Thank you for your consideration of this Environmental Assessment. If there is any further information or analysis that may be required, we would be pleased to provide that promptly.

Yours very truly,



John E. Fisher
General Manager

c.c. East Quarry Study Group Members
Mr. Derek Doyle, Director, Environmental Assessment Branch
Mr. Wilf Ng, Director, Approvals Branch
Mr. Hardy Wong, Director, West Central Region

Encl:

JEF:vlj

SCHEDULE A

TARO AGGREGATES LTD. EAST QUARRY ENVIRONMENTAL ASSESSMENT

SUPPORTING DOCUMENTS

Environmental Assessment Reports

Taro Aggregates Ltd. East Quarry Environmental Assessment - Executive Summary
Taro Aggregates Ltd., January 1995.

Taro Aggregates Ltd. East Quarry Environmental Assessment (Volumes 1 and II)
Taro Aggregates Ltd., January 1995.

Public Consultation Reports

Public Consultation Report
Joyce Young & Associates Ltd., January 1995.

Study Group Minutes
Taro Aggregates Ltd., January 1995.

Response Document
Taro Aggregates Ltd., January 1995.

Public Opinion Surveys, 1991 - 1994
Market Vision Research

Supporting Impact Assessment Reports

Taro East Quarry Environmental Assessment
Hydrogeological Impact Assessment
Gartner Lee Limited, January 1995.

Taro East and West Quarries
Geologic, Hydrogeologic and Hydrologic Technical Appendix
Gartner Lee Limited, August 1994

Taro East Quarry Environmental Assessment
Surface Water Impact Assessment
O'Neill Environmental in conjunction with Gartner Lee Limited, January 1995.

Taro East Quarry Environmental Assessment
Natural Environment Impact Assessment
Gartner Lee Limited, January 1995.

Taro Aggregates Ltd. East Quarry Environmental Assessment
Traffic Impact Assessment
RGP Transtech Inc., January 1995.

Taro Aggregates Ltd. East Quarry Environmental Assessment
Noise Impact Assessment
Vibration Assessment Limited, January 1995.

Taro Aggregates Ltd. East Quarry Environmental Assessment
Air Quality Impact Assessment
CJB Air Quality Management, January 1995.

Taro Aggregates Ltd. East Quarry Environmental Assessment
Visual Impact Assessment
The Landplan Collaborative Ltd., January 1995.

Taro Aggregates Ltd. East Quarry Environmental Assessment
Land Use and Planning Impact Assessment
Miller O'Dell Planning Consultants, January 1995.

Taro Aggregates Ltd. East Quarry Environmental Assessment
Economic Impact Assessment
C.N. Watson and Associates Ltd., January 1995.

Taro Aggregates Ltd. East Quarry Environmental Assessment
Community Health Assessment Study
Cantox Inc., January 1995. Accompanied by Appendices A to D.

Taro Aggregates Ltd. East Quarry Environmental Assessment
Social Impact Assessment Scoping Report
Armour Environmental Consultants Inc., January 1995.

Taro Aggregates Ltd. East Quarry Environmental Assessment
An Examination of the Social Environment and Community Impact Management Priorities
Holistic Impax Group Inc. and Urban Dimensions Group Inc., January 1995.

Supporting Facility Development Reports

Taro East Quarry Environmental Assessment
Design and Operations Report
Gartner Lee Limited, January 1995.

Taro East Quarry Environmental Assessment
Waste and Leachate Characterization Report
Gartner Lee Limited, January 1995.

Taro Aggregates Ltd. East Quarry Environmental Assessment
Quarry Blasting Impact Assessment
VME Associates Limited, January 1995.

All documents can be obtained by contacting Taro Aggregates Ltd., 65 Green Mountain Road, Stoney Creek, Ontario, L8J 1X5. Telephone: (905) 561-0305 or 1-800-335-5039.

EXECUTIVE SUMMARY

1.0 INTRODUCTION

Taro Aggregates Ltd. (Taro) is a Hamilton-Wentworth business which presently operates a solid non-hazardous industrial, commercial and institutional waste landfill, known as the West Quarry Landfill, and an adjacent limestone quarry aggregate extraction operation, known as the East Quarry. The Taro West Quarry provides disposal capacity for solid non-hazardous industrial, commercial and institutional waste generated in Hamilton-Wentworth Region but not accepted at the Region's Glanbrook landfill.

Taro Aggregates is a subsidiary of Philip Environmental Inc. and provides the disposal service for solid, non-hazardous industrial, commercial and institutional residues from Philip's 3Rs activities. Philip Environmental is a fully integrated by-product management and environmental services company based in Hamilton.

Taro expects that its West Quarry Landfill will be filled and closed in about 1995. Taro wishes to continue to provide its customers with waste disposal services. This Environmental assessment was undertaken by the company to study how this could be achieved in an environmentally acceptable manner.

This Executive Summary highlights the major conclusions of the Environmental Assessment, together with the major reasons for those conclusions. Reference should be made to the two volume Environmental Assessment for a more detailed description of the undertaking, the environmental assessment planning process, the analysis of alternatives and the assessment and management of effects. The purpose of the environmental assessment planning process and documentation is to ensure that the requirements of the Ontario Environmental Assessment Act (EAA) are satisfied.

The environmental assessment planning process both ensured a systematic and traceable procedure for identifying and assessing effects and alternatives and provided for the full participation of the local community. A Study Group, composed of seven local residents, two government representatives and two representatives from Taro assumed a major role in the planning process.

2.0 PURPOSE OF THE UNDERTAKING

Taro Aggregates Ltd. is a Stoney Creek business that presently operates a solid non-hazardous industrial, commercial and institutional waste landfill, known as the West Quarry, and an adjacent limestone quarry extraction operation known as the East Quarry. The existing Taro West Quarry landfill provides a disposal resource for solid non-hazardous industrial, commercial and institutional (IC&I) wastes not accepted at the Region of Hamilton-Wentworth Glanbrook municipal landfill. Taro's current customers are Dofasco Inc. and Philip Environmental Inc., the parent company of Taro. Taro's West Quarry landfill will be filled in 1995.

The Purpose of the Undertaking is to establish and operate a landfill site in the Taro East Quarry in order that Taro can continue its existing landfill business and continue to respond to the opportunity it has to meet the needs of its customers in the Hamilton-Wentworth Region who require disposal service for solid, non-hazardous, industrial, commercial and institutional waste, including the residue of waste brought into Hamilton for recycling and processing by Philip environmental Inc. The purpose of the undertaking is also to enable Taro to continue to assist Philip Environmental Inc. in sustaining Philip's integrated waste management, recycling and reuse business in the Region of Hamilton-Wentworth, by providing this disposal service.

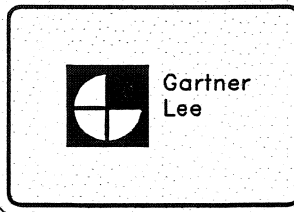
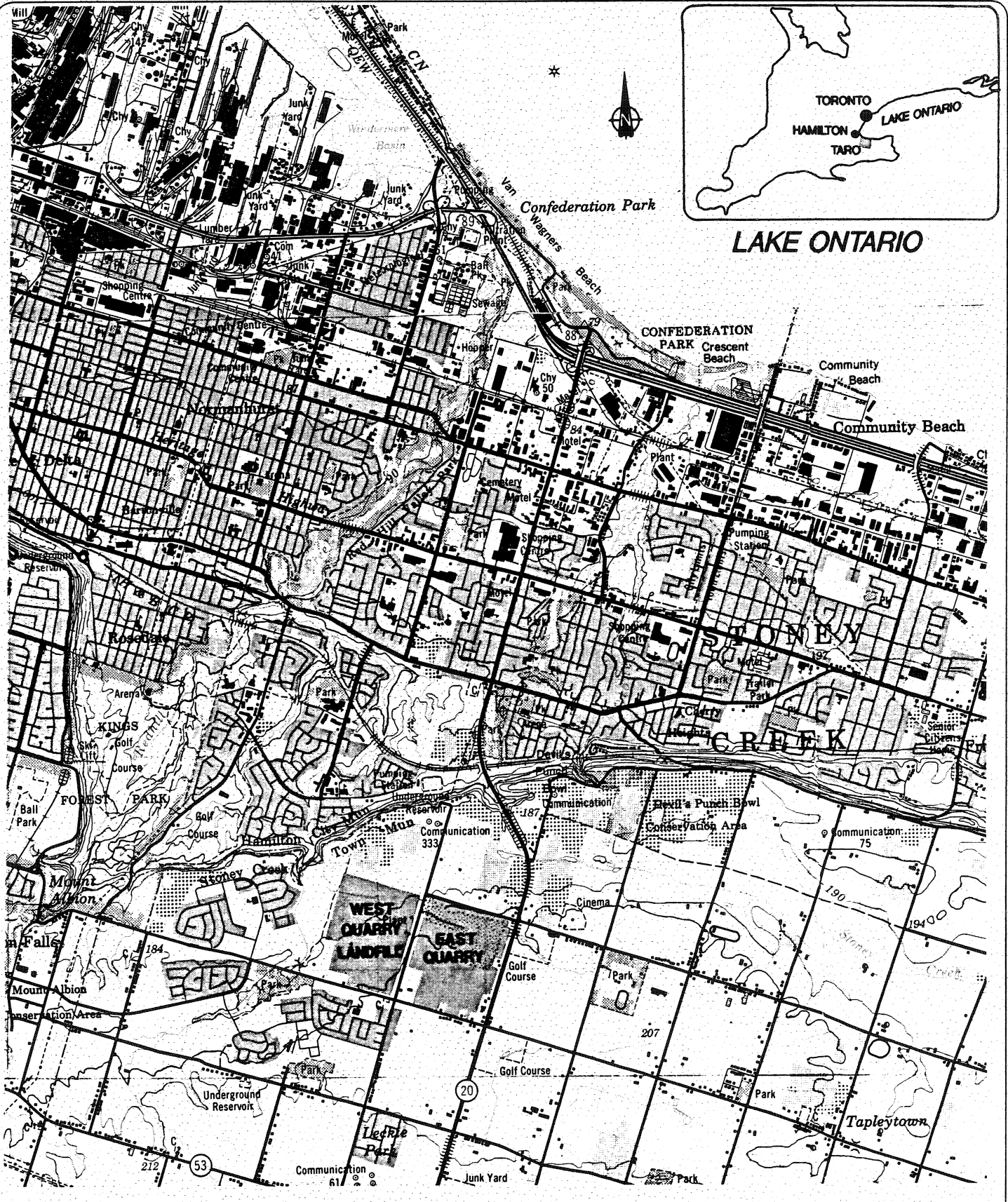
More specifically, Taro proposes to manage 400,000 to 500,000 tonnes per year of solid non-hazardous IC&I wastes generated within the Region of Hamilton-Wentworth for the 20 year planning period. The basis for this estimate of need and opportunity is provided in the assessment of need.

3.0 THE UNDERTAKING

The preferred alternative, that emerged from the analysis of alternatives to and alternative methods of carrying out the undertaking, is a landfill at Taro's East Quarry site. The basis for the selection of the preferred alternative is summarized in the sections that follow and is detailed in the Environmental Assessment.

3.1 SITE LOCATION

The site proposed for the East Quarry Landfill is located in the City of Stoney Creek in the Region of Hamilton - Wentworth (as illustrated in Figure A). The East Quarry site, as illustrated on Figure B (map pocket), is located north of Mud Street, east of Highway No. 20 and adjoining the existing West Quarry landfill. The West Quarry is currently used for landfill operations. It also includes an asphalt plant. Aggregate is currently being extracted from the East Quarry. The 77 ha site is bounded by Green Mountain Road on the north, Highway 20 on the east, Mud Street on the south and First Road West on the West.



TARO AGGREGATES LTD.
PROPOSED EAST QUARRY LANDFILL
ENVIRONMENTAL ASSESSMENT

Figure
A
 94-410 January 1995

3.2 OTHER SITE ACTIVITIES

It is anticipated that the West Quarry landfill will close in 1995. The Taro asphalt plant and the East Quarry aggregate extraction operations are expected to continue until 2001. At a minimum the rehabilitation of the quarrying operations would involve backfilling the slopes to a 2 to 1 grade, filling and grading the quarry floor and grassing over the extracted area. Minimum rehabilitation of the East Quarry aggregate extraction, assuming that the site would not be landfilled, would commence in 1995 and continue through until approximately 2006.

3.3 WASTE CHARACTERISTICS

The proposed landfill would receive solid non-hazardous waste from industrial, commercial and institutional sources from Philip Environmental Inc. and from Dofasco. Philip specializes in diverting materials from landfill for reuse, recycling and recovery (3R's). Thus the 3R's potential of wastes received from Philip is assessed prior to receipt by Taro. The major waste types currently received at the West Quarry landfill include steel making wastes, slags, industrial sands, dusts and ashes, miscellaneous industrial wastes and contaminated soils and rubble. Chapter 2 of the Environmental Assessment provides a more detailed breakdown of the typical wastes received. All wastes received at the site are checked, to ensure they are acceptable. Wastes not acceptable to Taro are diverted to other disposal facilities. Liquid, hazardous, agricultural or medical wastes or household garbage will not be accepted at the site. The proposal is to continue to manage similar types of wastes as currently received in a manner which maximizes 3R's potential and which ensures that only approved wastes are landfilled.

Unlike typical municipal landfill sites, the types of wastes received by Taro do not settle significantly over time. The contaminating lifespan of the proposed wastes is estimated at up to 300 years. Contaminating lifespan is the time frame during which the wastes are capable of producing leachate that is unacceptable for uncontrolled release to the environment. Based on experience at the West Quarry landfill the waste stream is a source of small amounts of combustible gas. Emissions of other gases are not expected to be significant.

3.4 SITE VOLUMES, CAPACITIES AND TIMING

The proposed landfill has a capacity of about 10 million tonnes. The predicted average annual tonnage is 500,000 tonnes, although short-term peaks equivalent to 2 million tonnes per year have been considered in the impact assessment. Landfilling at the site is expected to extend from 1995 to approximately 2015. After the site is filled, it would be closed, the final cover completed and the site totally revegetated.

3.5 BASIS FOR DESIGN

The proposed design and operations of the landfill (Figure C – map pocket) has been based on a detailed analysis of ground and surface water conditions. Consideration has also been given to aggregate operations in the East Quarry, experience with the West Quarry landfill, regulatory requirements and guidelines, and the nature of the wastes to be landfilled. The landfill is designed to accommodate about 10 million tonnes and to flexibly respond to variations in waste receipts. The landfill design ensures the protection of human health and the environment, especially with reference to leachate and gas control and site operations. The facility concept is technically simple yet state of the art to maximize ease of prediction and control.

As highlighted in subsequent sections of this summary, the process of optimizing the fit between the facility design and the site included an assessment of a range of design and operations alternatives for various major landfill components. The results of the assessment of the design and operations alternatives were combined with other facility characteristics. Further refinements to facility characteristics were introduced based on the assessment and mitigation of effects as part of the site assessment analysis.

3.6 LEACHATE CONTROLS

The geologic and hydrogeologic setting of the East Quarry does not provide adequate natural containment and attenuation. Engineered systems are, therefore, required to contain leachate within the landfill. The proposed leachate controls include a ground water collection system, a double liner system on the floor and sidewalls of the quarry, a leachate collection system, a final cover system and a leachate handling method. The ground water collection system will be constructed beneath the base of the double liner within the quarry floor and will consist of a series of granular-filled trenches excavated into the floor around the perimeter and beneath the landfill. The granular material in the trenches will be hydraulically connected to the granular grading layer that forms the base for the liner system. The double liner system consists of a synthetic/soil primary (upper) liner and a soil secondary (lower) liner, separated by a granular drainage layer. The leachate collection system consists of a network of perforated pipes within a gravel blanket spread over the primary liner. Leachate will flow downward through the wastes into the gravel and will then flow by gravity to the low point in the base of the landfill from which it will be pumped. Leachate collection will extend from the commencement of landfilling through the contaminating lifespan of the wastes. The final cover will be constructed of a layer of compacted clay soil overlain by a vegetated topsoil layer. Collected leachate will be pumped from the landfill and discharged to the Regional sanitary sewer system. A pre-treatment system can be retrofitted to produce leachate suitable for sewer discharge if required. A leachate control operating strategy has been developed for both the active landfilling period and for the period following completion of the landfilling, for the full contaminating lifespan of the leachate.

3.7 GAS MANAGEMENT

The gas management system involves a passive gas venting system consisting of a series of pipes rising out of the gravel layer that lies on the landfill side slopes and, in turn, connected to a header pipe around the landfill perimeter that will vent to the atmosphere. The double liner system and the passive gas venting system will ensure that landfill gases are adequately vented and will prevent migration off-site into buildings or enclosed spaces.

3.8 PHYSICAL SITE DESIGN, PHASING AND ACCESS

The existing 0.5% slope of the quarry floor will provide adequate flow of leachate within the granular blanket of the overlying leachate collection system. This slope also provides for a self-cleansing flow velocity within the leachate collection system piping. A 3:1 (horizontal: vertical) grade is proposed for the landfill side slope because steeper slopes would not permit the use of conventional methods for base liner system construction. The maximum elevation of the landfill will be about 214 mASL, including a 1 m final cover thickness over the wastes. The final contour plan largely maintains pre-quarrying surface drainage systems. The minimum 3% grade provides adequate runoff while minimizing surface erosion. A sedimentation/retention pond system will ensure that existing drainage courses will experience no significant additional flows or sediment loads. The final contour reflects the general shape of the pre-quarry landform. A passive open space recreational after use is currently assumed, although a final decision will be made in consultation with the community at a later time.

An eight phase site development is proposed. The existing on-site soil stockpiles will be sufficient for about 10 years of liner and cover construction, after which the importation of cover and liner soils will be required. All granular materials are expected to be produced by the quarry operation. No changes in site entrances and exits or in the location of weigh scales are anticipated. Trucks will continue to enter the site from the Highway 20 entrance and leave the site via First Road West, except during phases seven and eight when trucks will both enter and leave the site from First Road West. The proposed haul routes include Highway 20, First Road West, Mud Street west of Highway 20 and the proposed Redhill Creek Expressway. An average of 60 waste trucks per day are anticipated, with short-term possible peaks of up to 240 waste trucks per day. The importation of soils for cover and liner construction from about year 11 would generate, on average, a further 33 trucks per day.

3.9 LANDFILLING OPERATIONS, CLOSURE AND POST CLOSURE

The landfiling operation will occur concurrently with the existing quarrying and the West Quarry asphalt plant operations for approximately six years. The landfill will operate from 7:00 a.m. to 5:00

p.m. from Monday to Friday. Equipment maintenance can occur at any time. Liner and cover construction will proceed through the non-freezing period of the year. Waste will be dumped from trucks, spread in 1 m thick lifts by a bulldozer and compacted with a vibratory sheepsfoot compactor. One large bulldozer and one vibratory compactor will operate at the working face. The surface of the newly constructed area of liner will be covered as soon as possible with 1.5 m of waste to prevent damage from freeze-thaw cycles, desiccation and equipment traffic. Daily cover will not be required because the waste is non-putrescible. Granular materials will be stockpiled on the clay plug area to accelerate the settlement of the clay plug soils and to minimize further settlement after the liner system is constructed. Liner system construction and landfilling will not occur until late in landfill operations over the clay plug.

Storm water runoff originating within the active landfill area will be directed to temporary holding ponds and then discharged to the leachate collection system. Surface water generated on the open quarry floor will be directed to the quarry drainage system by sump and pump methods similar to current practice. This water will be retained in temporary ponds, analyzed for water quality to confirm it is clear, and then discharged off-site. The final contour plan includes a perimeter storm water drainage ditch and a storm water detention pond in the northwest corner of the site that will discharge to the northwest of the site. The perimeter ditch will be constructed generally in conjunction with the progressive rehabilitation of the final cover.

Proposed dust and mud control measures include; relocating the working face according to daily wind conditions, operating the working face below the level of surrounding lands on windy days where possible, minimizing the size of working areas and the duration of final cover construction, watering haulage roads, using a street sweeper regularly on the off-site roads and the construction and use of a truck-wash station. Significant odours are not anticipated because of the nature of the wastes although ammonia and hydrocarbon wastes will occasionally be present. The effect of any odours will be minimized by carefully locating the working face, by avoiding the placing of odourous materials under low wind and high temperature conditions and by the immediate covering of odourous materials by non-odourous waste. Noise impacts will be virtually unnoticeable above background noise levels from non-landfill traffic in the area, mainly because most of the operations will take place below grade in the quarry excavation. The limitation of construction activities to site hours of operation and the existing, 4 to 6 m high, grassed earth berms around the site perimeter will further reduce the potential for off-site noise impacts. All of this will go in the Certificate of Approval for the site.

Both the performance of the landfill engineering systems and environmental monitoring (e.g., ground water, surface water) will be undertaken. Contingency plans have been formulated as part of site design and approval, to address unexpected impacts and potential impacts identified through monitoring.

At the request of the Study Group, it was decided to defer the final determination of after-use until closer to closure because of the evolving nature of community needs and character. The final contours that take the form of a low, gently sloped hill, provide the flexibility for a variety of after-uses. The final after-use choice will comply with regulatory standards. Post closure maintenance and monitoring will be undertaken by Taro. Site approval will include a financial assurance package to ensure the availability of necessary funds to remedy any future problems.

Reference should be made to Chapter 9 of Volume II of the Environmental Assessment for further details regarding proposed facility characteristics.

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4.0 RATIONALE FOR THE UNDERTAKING - NEED

The assessment of need involved an analysis of the current regional waste management system, an estimate of future waste generation, a review of existing approved disposal capacity and the determination of additional disposal need. The need for additional disposal capacity was determined by comparing estimated quantities of waste requiring disposal in the future with current approved disposal capacity.

The analysis of the current system included an overview of public and private sector responsibilities, the characterization of the wastes requiring disposal and a description of private sector facilities within and outside of Hamilton-Wentworth. Future waste quantities estimates took into account historical trends, the general economic outlook for Ontario and Hamilton-Wentworth, the economic outlook for the steel industry and the potential for further waste reduction, recycling and reuse. Estimates of non-hazardous wastes requiring disposal, generated by the steel industry, by other sectors and by Philip's processing and waste reduction, reuse and recycling 3R's activities were prepared. The analysis of disposal capacity took into account existing and proposed landfill sites within the Region. The overall assessment of need involved the consideration of both the need for disposal capacity within the Region and Taro's continuing need to operate a waste disposal business and to provide disposal capacity for Philip Environmental after the closure of the West Quarry site. Consideration was also given to comments and suggestions from the Study Group and from the general public.

The overall assessment of need resulted in an estimate of between 760,000 and 800,000 tonnes of waste requiring disposal within the Region each year from the present to the year 2015. This estimate assumes a 40% diversion. The currently approved landfill capacity cannot handle this volume. The closure of the West Quarry in 1995 would also preclude Taro from providing disposal services within

the Region and reduce Philip's ability to continue its recycling operations. Taro's opportunity is to provide a facility to landfill 400,000 to 500,000 tonnes/year of solid non-hazardous IC&I wastes generated within the Region of Hamilton-Wentworth for the 20 year planning period. These wastes would consist of but not be limited to the IC&I wastes currently landfilled of by Taro.

Reference should be made to Chapter 2 of Volume I of the Environmental Assessment for further details regarding the need for the undertaking.

5.0 RATIONALE FOR THE UNDERTAKING - ALTERNATIVES TO THE UNDERTAKING

The alternatives to analysis is concerned with alternative ways of meeting the need. The alternatives to analysis involved a systematic procedure for identifying potential alternatives, screening potential alternatives and comparing reasonable alternatives. The alternatives to planning process involved the full and direct participation of the Study Group, the general public, Taro and its consultants and government agencies. The study area for the alternatives to analysis is the Region of Hamilton-Wentworth. Waste quantity assumptions were based on the assessment of need.

A long list of alternatives to were identified by the Study Group, Taro and the Ministry of Environment and Energy (MOEE). The long list of alternatives were consolidated into six alternative groupings: New Landfill, Export, 3R's, Incineration, Lakefill and Do Nothing. The New Landfill alternative would involve the approval and construction of a new landfill facility within the Region. It may include the rehabilitation of an existing site. The Export alternative involves the transportation of waste to an existing private licensed landfill disposal facility outside the Region. 3R's includes waste reduction, reuse and recycling. Incineration is the controlled combustion of solid, liquid or gaseous waste. Incineration reduces waste volumes and leaves it in a more stable form for disposal. Lakefill is the practice of creating new land by placing waste into land covered by water such as lakes and rivers. The Do Nothing alternative involves the maintenance of the status quo conditions within the Study Area. As such the existing waste management system in the Region continues until remaining capacity at existing landfills are used up and no other alternatives are implemented. The Do Nothing for Taro means that they would go out of business.

Screening criteria were applied to the long list of potential alternatives. Alternatives were screened from further consideration that could not be implemented by Taro or that would not meet government policies and regulations or that would not meet the need. Three alternatives - 3Rs, Incineration and Lakefill failed to meet the screening criteria.

The 3R's alternative was screened from further consideration because it would not meet the need, although it has been carried forward as a complementary activity. The need assessment had already allowed for a 40% diversion from landfill within the Region over the 20 year planning period. The need would only be met if diversion could be increased to 100%. Philip Environment continues to develop new processing methods and markets. While the diversion rate is increasing, the need to safely dispose of the residues from 3Rs activities will remain. Incineration was excluded because it is outside Taro's current and anticipated future business experience and expertise. Incineration is also contrary to government policy and produces a residue that still requires disposal. The Lakefill alternative would not comply with the government fill quality guidelines. Soil washing could reduce contaminant levels for some wastes but it would not meet all the need. In addition, the technology is unproven for the materials, contaminated water would require well disposal and further government approvals would be necessary.

New Landfill met all the screening criteria and was carried forward for further consideration. Export also satisfied the screening criteria although it is contrary to the general MOEE position that wastes should be managed within the same jurisdiction that they are generated. This position has not, however, been formalized into a legal requirement. The Do Nothing alternative was retained because MOEE guidelines require a comparison between the Do Nothing alternative and the preferred alternative.

The three alternatives that remained after the screening step were New Landfill, export and Do Nothing. The comparison of alternatives involved two paired comparisons – the first between New Landfill and export and the second between New Landfill and Do Nothing (refer to Table A). The comparison process involved the identification of criteria groups and criteria, the ranking of criteria groups, the comparison of the advantages and disadvantages of each pair of alternatives and the formulation of a rationale for the selection of the preferred alternative. The six criteria groups used in the comparisons were public health and safety, natural environment, social environment, cultural environment, economic environment and impact on Taro. The Study Group ranked public health and safety, natural, social, and cultural environment as important and economic, impact on Taro and approvals were ranked less important. Approvals was not considered as it was the same for all sites. The comparison process also involved the consideration of mitigation/enhancement potential by means of a net effects analysis. The Study Group assumed a central role in the comparison process. New Landfill was preferred in both cases.

Table A: Comparison of "Alternatives To" Summary

<i>New Landfill and Export</i>	<i>New Landfill and Do Nothing</i>
<p><i>Preference for New Landfill for the following reasons:</i></p> <ul style="list-style-type: none"> a) The two alternatives have equivalent health and safety effects at the landfill sites. However, accident risks along access routes are greater with export. b) Natural environmental impacts at the two landfill sites are comparable but the disturbance of wildlife along access routes are greater with export. c) The use and enjoyment of property impacts are comparable on and in the vicinity of the two sites but access route impacts would be greater with export. The export alternative is also less compatible with existing Regional infrastructure, less reliable in terms of service provision and offers less municipal and community control. These social disadvantages more than offset a potentially lower community character impact with export. d) The two alternatives result in comparable cultural areas/resource impacts. e) New Landfill is favoured over export from an economic perspective because of greater direct and indirect employment opportunities within the Region. f) New Landfill is favoured over export from Taro's perspective because of the greater opportunity to maintain or enhance market share, revenue and profits, service control, operational integration, adaptability to market changes and employment levels. 	<p><i>Preference for New Landfill for the following reasons:</i></p> <ul style="list-style-type: none"> a) Health risks from the landfill and accident risks along access routes are greater with Do Nothing because of the potential for a large number of storage sites and the potential for illegal dumping. b) Ground and surface water contamination potential and the disturbance of wildlife and the natural environment (on-site, in the site vicinity and along access routes) are greater with the Do Nothing alternative because of a larger number of storage sites and the impacts associated with illegal dumping. c) The combination of more storage sites, illegal dumping and potential job losses associated with the Do Nothing alternative, result in greater social displacement and disruption impacts, greater community character and cohesion changes and adverse impacts on infrastructure, level of service and security and local control. It could also lead to the greater displacement of cultural areas and resources. d) There are greater adverse impacts associated with the Do Nothing Alternative, stemming from generators implementing their own solutions, illegal dumping, multiple storage sites and employment loss for businesses unable to manage their own wastes. Adverse economic impacts resulting from the Do Nothing Alternative could include unnecessary capital and operating costs, additional displacement and compensation costs, property value reductions, greater long term liability costs and reduced employment in both landfilling and in related industries and services. e) The Do Nothing alternative would mean that Taro would no longer be in business. This is clearly less preferred from Taro's perspective because of reduced competition, market share, revenue and profit, control of services, integrated services, ability to adapt and employment. It would also reduce Taro's ability to serve Philip and support Philip's recycling activities.

The alternatives to analysis resulted in the New Landfill alternative being carried forward to the next step in the environmental assessment planning process. Further details regarding the alternatives to analysis are provided in Chapter 3 of Volume I of the Environmental Assessment.

**RATIONALE FOR THE UNDERTAKING – ALTERNATIVE METHODS –
SITING ALTERNATIVES**

The siting alternatives analysis involved a systematic procedure for identifying, screening and comparing alternatives sites. Study Group, area residents, the general public and MOEE comments, suggestions and interpretations were incorporated into each step in the siting process.

The siting process encompassed all properties owned or controlled by Taro or Philip Environmental Inc. within the Region of Hamilton Wentworth. This approach reflected a range of considerations including; the inability of the private sector to expropriate land, fix land prices or control or predict municipal planning or provincial environmental requirements, Taro's existing knowledge of the land it controls and reduced knowledge and greater exposure to environmental liabilities with lands that it does not control and the opportunity to make use of existing infrastructure and other assets with properties that it owns or controls. The site search was limited to the Region of Hamilton–Wentworth because the alternatives to analysis had indicated a preference for a New Landfill within the Region over export to a landfill outside the Region. This approach was supported by the Ministry of Environment and Energy.

Taro and Philip own a total of 12 properties within the Region. Two screening criteria – ability to meet a portion of the waste disposal need (five years of landfill capacity) and existing and anticipated land uses and on-site structures were applied in the analysis. Five years was used as a lower limit because it would take at least five years for Taro to obtain approval for another landfill site to continue on in business. A minimum site size of 20 ha is required to provide five years capacity and to include the requisite buffer zone and entrance, administration building and maintenance facilities. The existing uses and facilities criterion pertains to existing uses required by Philip Environmental's waste management business for the foreseeable future.

The site screening analysis excluded eight properties. The properties and the reason they were excluded are outlined in Table B below.

<i>Table B: Sites Screened Out from Further Consideration</i>	
<i>Site Location</i>	<i>Rationale</i>
237 Brant Street (Yard #1)	This site does not meet the minimum size requirement and also contains existing buildings that are currently used as a waste transfer and processing facility.
77 Brant Street (Yard #2)	This site does not meet the minimum size requirement and also contains existing buildings that are currently used as a waste transfer and processing facility.

Table B: Sites Screened Out from Further Consideration (continued)	
Site Location	Rationale
52 Imperial Street (Yard #3)	This site does not meet the minimum size requirement and also contains existing buildings that are currently used as a waste transfer and processing facility.
175 Stuart Street	This site does not meet the minimum size requirement. It also contains a former foundry which is no longer in use.
670 Stratheame Avenue	This site does not meet the minimum size requirement. It also contains buildings related to a tin recycling business.
1579 Burlington Street East	This site contains large industrial buildings related to an old Firestone tire plant. Portions of these buildings are used for recycling activities by Third Sector recycling and a weekend Flea Market.
799 - 800 Parkdale	This site contains large industrial buildings related to the former Stelco Main Processing plant. It is currently used as a waste transfer and processing facility.
Part Lots 5 and 6, Concession 4 and 5 (Vinemount Site E)	This site was sold in March 1993 to a third party for aggregate extraction purposes.

Mitigation potential was considered before finally excluding the above properties. Sites 1 to 7 are located within an industrial area surrounded by industrial uses. As a result, there are no opportunities to expand the sites to meet minimum size requirements. Furthermore, transforming an existing industrial use to a landfill would forever remove the land from long term productive industrial use. All of these properties also have structures in use and other activities too valuable for displacement for landfill purposes.

Of the remaining sites, the Taro East Quarry (Site 8) (76.89) and the Taro West Quarry (Site 12) 52.2 ha) readily comply with the screening criteria. Based on the size criterion, Site 10 would have been excluded and Site 9 would have just meet the criterion. However, given the close proximity of the sites, the properties were combined into a single alternative. In this way the need would be satisfied for a longer duration. Even taken together, though, Sites 9 and 10 cannot meet Taro's full need for the 20 year planning period, whereas the East Quarry and West Quarry expansion can.

The site comparison process conducted with the assistance of the Study Group began with the preparation of a long list of comparison criteria and indicators. Site-specific landfill designs were prepared for each of the three sites. On-site, site vicinity (within 500 m, 500 m to 1,000 m) haul route and community study areas were identified and a rationale provided for each study area. Data were collected from secondary sources, agency contacts, field reconnaissance and aerial photography and

compiled on maps and summary data matrices. The analysis and compilation of data resulted in some refinements in criteria and indicators. Potential differences in impact magnitude were consistently addressed by means of a data scaling procedure. The data scaling procedure defined major, moderate, minor and unconstrained scaling levels for each indicator. These scaling levels were then used in the application of criteria and indicators to each site. A net effects analysis was undertaken to ensure that sites were only compared after the consideration of mitigation potential. The importance of impacts was addressed through the ranking of criteria groups by the Study Group. The Study Group considered public health and safety, the natural environment, the social environment and the cultural environment to be more important than the economic environment and impact on Taro.

Sites were compared two at a time – a paired comparison. The comparative analysis focussed on differences in predicted net effects. The analysis progressively considered differences at the indicator, the criterion and then the criteria group level. The Study Group was directly involved in the site comparison process. The East Quarry was compared first to the Vinemount Properties and then to the West Quarry. The East Quarry alternative was preferred in both cases in the technical comparison and by a majority of the Study Group (refer to Table C).

Table C: Siting Alternatives Summary

<i>East Quarry and Vinemount</i>	<i>East Quarry and West Quarry</i>
<p><i>Preference for East Quarry for the following reasons:</i></p> <ul style="list-style-type: none"> a) There is no preference between the two sites for the health and safety criteria group. The East Quarry has the potential to impact on more residents within 500 m of the site, whereas, the Vinemount site has greater potential impacts due to exposure to dust and to result in greater potential traffic route accidents. b) The East Quarry is preferred to the Vinemount site for the natural environment criteria group. The Vinemount site has greater potential to impact upon surface water resources, loss of terrestrial and aquatic ecosystems, disturbance to aquatic ecosystems (noise, dust, odour) and on resources. c) The East Quarry is preferred to the Vinemount site for the social environment criteria group. The Vinemount site has greater potential impacts related to social disruption along haul routes, community impacts. Both have advantages and disadvantages with regard to social disruption within the site and site vicinity. 	<p><i>Preference for East Quarry for the following reasons:</i></p> <ul style="list-style-type: none"> a) The East Quarry is preferred to the West Quarry for the health and safety criteria group. Advantage for East Quarry as it will potentially affect only about 20% of the residents compared to the West Quarry. Furthermore, the East Quarry is anticipated to have somewhat less dust impacts due to the below-grade operations. b) The East Quarry is preferred for the natural environmental criteria group. Advantage for the East Quarry as West Quarry will result in the loss of up to 9 ha of Class 3 and 6 agricultural soils and improved farmland. c) The East Quarry is preferred over the West Quarry for the social environmental criteria group. The West Quarry has greater potential for social disruption within the site vicinity due to noise, dust, odours as well as visual impacts on the landfill (hill). The above grade construction is anticipated to have greater community impacts. It may also have a more restricted after-use due to final contour constraint.

Table C: Siting Alternatives Summary (continued)

<i>East Quarry and Vinemount</i>	<i>East Quarry and West Quarry</i>
<p>d) There is a preference for the Vinemount property for the cultural resource criteria group. The East Quarry site may potentially impact upon three cultural features due to noise, dust, and odour. However, because the landfill is primarily below grade, the potential impacts on these features is expected to be very limited.</p> <p>e) There is no preference between the two sites for the economic environment criteria group. The Vinemount site will displace a portion of an active farm while the East Quarry may potentially disrupt more businesses within the site vicinity. The Vinemount site may potentially impact on a greater number of farms along the haul routes. While the East Quarry may impact on more business.</p> <p>f) The East Quarry is preferred over the Vinemount site for impacts on Taro because of lower facility planning, design, approval and capital costs.</p>	<p>d) There is no preference between the two sites for the cultural impact criteria group. Both sites may potentially impact similar cultural features.</p> <p>e) There is no preference between the two sites for the economic impact criteria group. The East Quarry may potentially disruption seven more farm operations within the off-site impact zones, due to nuisance impacts. The West Quarry will displace one leased farm field.</p> <p>f) There is no preference between the two sites for Impact on Taro. The East and West quarry sites both have existing on-site infrastructure which could be used for the new landfill. The capital and operating costs are anticipated to be similar for both sites.</p>

Overall, the slight cultural resource preference for the Vinemount site is more than offset by the natural environmental, social environmental and impact on Taro preference for the East Quarry site.

Overall, the East Quarry is preferred to the West Quarry. The West Quarry is expected to have greater potential health and safety, natural environment and social impacts than the West Quarry. The two sites are equivalent for the remaining criteria groups.

Since the site comparison analysis was undertaken, Taro's parent company Philip Environmental Inc. acquired two additional properties in the Region. These include Waxman Resources Inc. (500 Centennial, Hamilton) and IW&S (Ferrous) (75 Windemere, Hamilton). These properties were both screened out as they did not meet the screening criteria based on size and were fully utilized for recycling operations.

Reference should be made to Chapter 4 of Volume I of the Environmental Assessment for more details regarding the analysis of siting alternatives.

**RATIONALE FOR THE UNDERTAKING – ALTERNATIVE METHODS –
DESIGN AND OPERATIONAL ALTERNATIVES**

The Design and Operational alternatives analysis further avoids and minimizes the potential for adverse environmental effects from a landfill at the East Quarry site. The analysis involved a review of the major components of the landfill to identify where alternative methods might be considered. A reasonable range of alternatives was formulated for each component. The initial identification of alternatives took into account both experience with other landfills and site-specific conditions associated with the East Quarry. The principle influences on the process of identifying alternatives included geologic, hydrogeologic and surface water site characteristics, the East Quarry aggregate operations, the West Quarry landfill and the characteristics of the wastes.

The major design components included leachate controls, gas management, physical site design (base grading) and landfill development. With reference to leachate controls, there were design options concerning the ground water collection system, the base liner system, liner materials, the leachate collection system, final cover and leachate treatment. Once alternatives were identified, the environmental advantages and disadvantages were systematically identified and compared. The result was a preferred alternative for each component of the landfill.

The environmental differences among the design and operational alternatives pertain largely to the potential to generate effects (e.g., leachate, gas, traffic, dust, surface water, noise, visual intrusion) and, in turn, to affect public health and safety, the natural environment, the social environment and capital and operating costs. Differences in effects also tend to be confined to the on-site and immediate site vicinity. These characteristics are reflected in the choice of study areas and in the choice of criteria groups and criteria. The comparison of design and operational alternatives incorporated the views of a range of EA participants, as, for example, the Study Group's rankings of criteria groups.

A summary rationale for the rejection or retention of the various design and operational alternatives is provided in Table D. Reference should be made to Chapter 8 of Volume II of the Environmental Assessment for more details regarding the assessment of the design and operational alternatives.

Table D: Summary Rationale – Design and Operational Alternatives		
Components	Alternatives	Rationale for Preference
Ground Water Collection	<ul style="list-style-type: none"> i) perimeter collector drain ii) perimeter collector drain with underdrains iii) perimeter ground water extraction wells 	<p>Alternative ii) is preferred. All three alternatives are capable of working as a contingency leachate collection system for collecting ground water throughout the site. A high degree of reliance must be placed on the engineered leachate control systems because of the lack of geologic containment in the East Quarry. The addition of underdrains (Alternative ii) enhances the ability to collect ground water throughout the site and reduces potential health, safety and natural environmental impacts.</p>

Table D: Summary Rationale – Design and Operational Alternatives (continued)

<i>Components</i>	<i>Alternatives</i>	<i>Rationale for Preference</i>
<i>Base Liner System</i>	<ul style="list-style-type: none"> i) single liner system ii) double liner system 	A double liner system is preferred, from a public health and safety and natural environment perspective, because it will reduce leachate migration potential. The single liner system does result in less noise and dust during construction but these impacts can be controlled through standard mitigation. A double liner is preferred from an impact on Taro perspective because the lower operating and maintenance costs are expected to offset the higher capital costs.
<i>Alternative Liner Materials</i>	<ul style="list-style-type: none"> i) fine-grained soil primary and secondary liners ii) composite primary liner and fine-grained soil secondary liner iii) composite primary and secondary liners 	Alternative ii) is preferred to both Alternatives i) and iii). Alternative ii) is preferred to Alternative i) because it would result in lower leachate hazard and is less costly. Alternative ii) and iii) are equivalent for all criteria groups except for impacts on Taro. Capital costs are lower with Alternative ii) than with iii).
<i>Leachate Collection Systems</i>	<ul style="list-style-type: none"> i) granular blanket ii) granular blanket with perimeter and underdrain pipes iii) leachate recovery wells 	The three alternatives are similar in their ability to collect leachate and in terms of potential environmental impacts. Alternative ii), however, provides an additional level of contingency leachate control by virtue of the extension of the leachate collection pipes under the entire landfill. While these pipes are not expected to be needed for leachate collection, the piping system adds an extra level of leachate control that can be used if necessary.
<i>Final Cover System</i>	<ul style="list-style-type: none"> i) low permeability soil cover ii) synthetic cover 	Alternative i) is preferred principally because the higher gas transmissivity of the soil cover allows combustible gases to vent out of the landfill, it provides more after use flexibility and it has a lower capital and maintenance cost.
<i>Leachate Treatment Alternatives</i>	<ul style="list-style-type: none"> i) direct sanitary sewer discharge ii) on-site pre-treatment and sanitary sewer discharge iii) full on-site treatment 	Alternative i) is preferred because it provides adequate leachate treatment in the most cost-effective manner. The selection of this alternative is predicated on the assumption that the leachate will comply with sewer-use by-laws. If actual leachate characteristics indicate that compliance with sewer-use by-laws is unlikely, the flexibility exists to retrofit the site with either a pre-treatment or a full treatment plant.
<i>Gas Control</i>	<ul style="list-style-type: none"> i) passive venting ii) active gas extraction 	Alternative i) Passive Venting is preferred for gas control because it provides the degree of control needed, it places the least reliance on mechanical systems (i.e., it is simpler to build, operate and maintain) and it is less expensive. If needed the system could be converted to an active extraction system in the future.

Table D: Summary Rationale – Design and Operational Alternatives (continued)

<i>Components</i>	<i>Alternatives</i>	<i>Rationale for Preference</i>
<i>Base Grading</i>	i) slope to the northwest ii) slope to the southeast	Alternative ii) is preferred for all criteria groups. The slope to the southeast (Alternative ii) has lower dust hazard because it requires less excavation and fill material. It would also allow for a larger waste volume below grade, reducing the amount of waste above the surrounding landscape. In addition, by using the existing quarry slope, it reduces grading requirements and associated construction costs.
<i>Landfill Development</i>	i) area landfilling method ii) cell landfilling method	Alternative ii), Cell Landfilling Method is the preferred alternative. It is preferred for all criteria groups. The main advantage of cell landfilling is that each cell can receive final cover when finished, rather than waiting until the end of landfilling to cover the site. Dust and leachate generation will be minimized by progressive covering.

8.0 RATIONALE FOR THE UNDERTAKING – NET EFFECTS OF THE PROPOSED UNDERTAKING

The assessment of effects associated with the proposed undertaking involved the formulation of an overall approach, the establishment of baseline conditions (existing and future environmental conditions without the undertaking), the review and evaluation of design and operational alternatives (addressed in the previous section), the identification, prediction and interpretation of effects from the proposed undertaking, the determination of measures to mitigate adverse effects and to enhance benefits, the interpretation of effects after mitigation/enhancement (net effects), the preparation of a final design and operating concept and the formulation of an overall impact management strategy.

The site assessment analysis identified on-site, site vicinity, haul route and community study areas and addressed effects within each study area. A 20 year time horizon was used beginning in 1995 and extending to 2015. Activities and effects extending beyond the year 2015 were also considered.

The major site assessment disciplines include: geology and hydrogeology, surface water, terrestrial and aquatic biology, traffic, noise, air quality, visual, land use, economics, community health and social. The same criteria as were used in the site comparison process were applied in the site assessment analysis, although site assessment was undertaken at a greater level of detail. Each environmental discipline was provided with the facility characteristics assumptions and instructed to impose the facility on the baseline conditions. Information was exchanged among related disciplines (e.g., noise, traffic, air quality) to assess interconnections among impacts and the potential for cumulative effects. Where potential negative impacts were identified, recommendations were made to further mitigate or enhance the landfill design and operations. Each discipline reviewed the potential

impacts, mitigation/enhancement measures and net effects (i.e., predicted impacts after mitigation/enhancement) to resolve conflicts among disciplines. Mitigation and enhancement recommendations were incorporated in the facility design and operations and the magnitude and significance of net or residual effects were interpreted. The potential impacts, mitigation/enhancement measures and net effects were summarized in tabular form under the site assessment criteria for each discipline. The analysis was documented for each study area to clearly define the affected areas.

Each environmental discipline formulated their own methods. examples of methods used to identify, predict and interpret the significance of impacts included computerized modelling, interviews and attitude surveys, qualitative and quantitative assessments and the interpretation of government regulations and policies. Each discipline considered the following in the site assessment process; magnitude and significance of effects, distribution of effects within the various study areas, distribution of effects over time, interrelationships among disciplines, change from baseline conditions, ability to mitigate the impacts and direct and indirect effects.

The site assessment analysis, including the methods used, is summarized in Chapters 7 through 12 of Volume II of the Environmental Assessment and is presented in greater detail in technical support reports. The results of the site assessment analysis are highlighted in Table E.

Table E: Summary of Site Assessment Analysis		
Criteria Group/Potential Impact	Additional Mitigation	Net Effects
<p><u>Public Health and Safety</u></p> <ul style="list-style-type: none"> - no potential for combustible gas accumulation; venting on-site and liner prevents off-site migration - no potential gas inhalation effects; field testing indicates MOEE standards will be met and health effects study indicates no effects - no dust inhalation effects expected although very sensitive individuals could suffer occasional irritation - no hazardous or dangerous materials transportation effects because such materials not permitted at landfill - no avian effects from gull interference because non-putrescible IC&I wastes do not attract gulls - local roads and intersections have adequate design capacity to handle Taro's traffic even with Heritage Green development traffic; access routes will satisfy Region's design requirements - no ground water health or safety effects predicted because leachate collection system will prevent leachate from entering ground water - no surface water health or safety effects predicted because storm water management system will segregate and treat leachate contaminated surface water; health assessment concluded no significant health effect from accidental contact with or ingestion of leachate - no disease transmission from vermin because site will accept only non-putrescible IC&I wastes that do not attract vermin 	<ul style="list-style-type: none"> - no further mitigation required or proposed for all potential public health and safety effects 	<ul style="list-style-type: none"> - no adverse public health and safety effects - no health effects from dust inhalation predicted, although very sensitive individuals may occasionally suffer irritation when conditions are most severe on the Taro property

Table E: Summary of Site Assessment Analysis (continued)

Criteria Group/Potential Impact	Additional Mitigation	Net Effects
<p><u>Natural Environmental</u></p> <ul style="list-style-type: none"> - the landfill will remove some natural infiltration and ground water recharge which could, in turn, marginally lower the water table and cause a slight reduction in water levels in underlying aquifers - potential for storm water discharge to contain excessive sediment due to erosion; no other storm water effects anticipated because storm water management similar to current quarry operations which has operated for many years without significant effects - the landfill will remove some natural infiltration and ground water recharge and dewatering will continue during landfill construction; the amount of ground water flowing into off-site streams (baseflow) could be reduced - there will be no loss of terrestrial or aquatic ecosystem features due to landfill construction because none of these features are on the East Quarry site - there are no ANSIs, ESAs, designated cold or warm water fisheries, classified wetlands or other important drainage features within 1,000 m of the site; there are some woodlots and small hedgerows within 1,000 m of the site; no impacts on off-site terrestrial or aquatic features are predicted - dewatering for landfill construction will have similar effects to quarry dewatering; no additional impacts on wells are anticipated - no natural surface water features will be removed from the site - surface water flow from the First Road West drainage ditch, that flows into Redhill Creek below the Escarpment will be stopped, but the volume is insignificant; no other surface water use effects are anticipated - no agricultural, mineral, recreational or forestry resources will be displaced - dust and noise may occasionally affect West Quarry Landfill afteruses ; traffic noise from Mud Street will mask noise from the East Quarry landfilling and the West Quarry recreation area is usually upwind from the site; overall disruption is expected to be minor; peak park use will occur when Taro operations are closed - there are no terrestrial or aquatic ecosystems along the local portion of the haul route (First Road West, Mud Street); Taro's landfill traffic will be insignificant on Highway 20 and is not expected to further disturb terrestrial or aquatic features - haul route traffic may occasionally disrupt the West Quarry playing fields; Taro's landfill traffic will be insignificant on Highway 20 and is not expected to disrupt park access; peak park use will occur when Taro operations are closed 	<ul style="list-style-type: none"> - artificial recharge to infiltrate part of the runoff into the ground water system - construction of two settling ponds in the northwestern corner of the site to remove sediment prior to off-site discharge - artificial recharge of the ground water will replace baseflows; artificial recharge to the ground water system will improve well yields during construction - no further mitigation for other potential natural environmental effects are considered necessary or warranted; if haul route traffic is more disruptive than is anticipated there is the potential to move the exit to Highway 20 	<ul style="list-style-type: none"> - no ground water effects are anticipated; the artificially recharge system should be capable of maintaining ground water recharge and ground water levels - no surface water impacts are anticipated; sediment should be effectively removed by sediment ponds and the artificial recharge system should be capable of maintaining the surface water baseflows - minor noise and dust nuisances may be experienced on occasion at the proposed West Quarry playing fields - haul route traffic may be an occasional nuisance for those accessing playing fields proposed for the West Quarry landfill after-use; potential to consider moving the landfill exit to Highway 20 to eliminate potential effects - no other natural environmental effects are anticipated

Table E: Summary of Site Assessment Analysis (continued)

Criteria Group/Potential Impact	Additional Mitigation	Net Effects
<p><u>Social Environment</u></p> <ul style="list-style-type: none"> - no residents or public uses will be displaced - no disruption of existing or future residential properties or public uses are anticipated; landfill noises may occasionally be audible but the overall noise levels will not increase relative to background sources; landfill-related dust may be an off-site nuisance on rare occasions when extreme weather conditions occur - local traffic networks are not predicted to be disrupted significantly compared to baseline conditions; the local access routes will function within their designated capacity and provide a good level of service for the life of the landfill, even with the additional Heritage Green development traffic - visual impacts will be low because the screening berms will limit visibility and the operations will be mainly below the level of the berm; the low hills and gentle slopes of the finished landfill will blend with the local topography in a more compatible manner than minimum quarry rehabilitation - there will be no nuisance effects from vermin because the landfill will only accept non-putrescible IC&I wastes - the level of local public service provided by the landfill will be unaffected because the landfill will not provide waste disposal services to local residents - in terms of other public services, Taro is contributing to the maintenance of First Road West and is currently cost-sharing the upgrading of First Road West with the City of Stoney Creek - the principal haul routes to the site vicinity will be along major highways and arterial roads designed to accommodate heavy truck traffic; Taro's landfill truck traffic will be an insignificant component of total traffic; therefore, residential properties and public uses and local traffic networks will not be significantly affected by Taro's landfill traffic - community character and cohesion is unlikely to be affected; residential concern about the proposed landfill is low and focused primarily on environmental pollution rather than on the potential for the landfill to negatively affect the community's character and cohesion - landfill will not provide public disposal for residential waste, but will provide continued disposal of wastes from industries, businesses and institutions serving the community - the landfill use is compatible with the current Regional Official Plan, and the City has implemented zoning on adjacent land to provide buffer from residential development until the completion of landfilling - the site is not within the Niagara Escarpment Plan area and there are no other applicable provincial or federal land use restrictions for the site - The City of Stoney Creek has planned for urban residential land use in the area; the site after-use can be made compatible; the actual after-use will be determined through public consultation, including the Region and the City 	<ul style="list-style-type: none"> - although no further mitigation is required for disruption to local traffic networks, the relocation of the site entrance/exit to Hwy 20 could be considered as a form of enhancement to further reduce local traffic disruption - tree and shrub planting between the berms and the property boundaries will further reduce visibility of the operations and will reduce the visual impact from low to very low - no further mitigation is required or warranted for any other potential social impacts 	<ul style="list-style-type: none"> - no displacement or disruption impacts; nuisance impacts associated with the landfill should be infrequent and minor in nature, and are not expected to affect the use and enjoyment of adjacent properties - although no disruption to local traffic networks, a relocation of the site entrance/exit to Highway 20 could be considered to further reduce local traffic effects - very low visual impacts are anticipated - in terms of effects on other public uses, Taro is contributing to the maintenance of First Road West and is cost - sharing the upgrading of First Road West with the City of Stoney Creek - in terms of haul route impacts the East Quarry landfill trucks will not be a significant component of the total traffic and the haul routes have sufficient capacity - in terms of community services, the continued disposal of wastes from industries, businesses and institutions serving the community - no other social environmental impacts are anticipated

Table E: Summary of Site Assessment Analysis (continued)

Criteria Group/Potential Impact	Additional Mitigation	Net Effects
<p><u>Cultural Environment</u></p> <ul style="list-style-type: none"> - no cultural resources will be displaced - there may be occasional noise and dust nuisances from the East Quarry Landfill at Felker's cemetery, which is about 200 m away; these will be relatively minor compared to other sources in the area - the Billy Green Home and another local century home are about 800 m from the landfill; they are not predicted to be impacted by the East Quarry landfill - there are no registered archaeological sites on the East Quarry property and there are unlikely to be remaining undiscovered archaeological resources because the entire site has been disturbed by quarry operations - there are no designated or potential sites of historical significance along the local haul routes 	<ul style="list-style-type: none"> - no additional mitigation beyond the measures already included in the facility design and operations are required 	<ul style="list-style-type: none"> - there may be occasional noise and dust nuisance effects at Felker's cemetery; these effects will be relatively minor compared to other noise and dust sources in the area - no other cultural environmental impacts are anticipated
<p><u>Economic Environment</u></p> <ul style="list-style-type: none"> - no businesses or farms will be displaced - overall business operations impacts in the site vicinity will be limited; businesses are generally compatible as evidenced by their establishment and continued operations near the site; over 50% said they experienced positive or no impacts - No impact on the residential market is forecast since there are sufficient units in the development process to meet the long term demand and provide a healthy market; although there are no direct restrictions on non-residential development, an adequate supply of approved land should be available in other locations to maintain a healthy market - no impact on property values is predicted; the current value already reflects the presence of Taro's operations; construction of the East Quarry landfill may delay a potential additional increase of 0 to 5% in housing prices in the landfill vicinity until the site closes - minimal business impacts are anticipated along the haul routes because the principal haulage routes will be along major highways and arterial roads designed to accommodate heavy truck traffic; Taro's traffic will be a minor component of the total traffic on these routes and will not result in significant additional impacts - positive effect on industries, businesses and institutions who rely on Taro's disposal facilities and who supply goods and services to Taro for landfill construction and operations; estimated \$20 million of capital investment 	<ul style="list-style-type: none"> - in terms of financial liability, Taro will provide funding for municipal assurance; the municipality could use these funds to continue to operate/maintain the landfill or sell to another operator should Taro fail to meet its requirements - no further mitigation measures are required 	<ul style="list-style-type: none"> - impacts on business operations in the site vicinity are expected to be limited - construction of the East Quarry landfill may delay a potential additional increase of 0 to 5% in housing prices in the landfill vicinity until the landfill closes - effects on businesses, industries and institutions that rely on Taro's disposal facilities or that supply goods and services to Taro will be positive (\$20 million capital investment) - no municipal financial liability impacts will occur with provisions for financial assurances - eight new jobs will be created and related business employment will be maintained or increased

Table E: Summary of Site Assessment Analysis (continued)

<i>Criteria Group/Potential Impact</i>	<i>Additional Mitigation</i>	<i>Net Effects</i>
<p><u><i>Economic Environment (continued)</i></u></p> <ul style="list-style-type: none"> - there will be no financial responsibility to the municipality under normal conditions for the Taro landfill; the municipality may have some financial liability if Taro were to abandon the site during operation or site closure - eight jobs will be created and employment in related businesses will be maintained or increased - the net annual financial benefit to the City will be \$23,000; the Region will benefit by \$63,000 and the School Board will be unaffected (1992 dollars) - the landfill is consistent with the Regional objective of preserving landfill capacity for municipal waste and diverting solid, non-hazardous IC&I waste to other landfills such as Taro; this will delay municipal cost required to expand or replace existing landfills - no significant effect on the Provincial or Federal tax base is predicted - no significant change to waste haulage costs for customers is anticipated; maintenance of equivalent haulage costs for users - no significant change in tipping fees to customers is anticipated; tipping fees will be structured similarly to those associated with the West Quarry landfill 		<ul style="list-style-type: none"> - the annual financial benefit to the City and the Region will be \$23,000 and \$63,000 respectively; the School Board will be unaffected - the Taro landfill is consistent with regional waste management objectives - no provincial or Federal tax effects are anticipated - haulage costs and tipping fees are not expected to change significantly

Review of the impact assessment work shows that there are only a few negative net effects predicted for the East Quarry Landfill. These include:

- a) Generally, dust levels from the East Quarry Landfill will not be a nuisance to the surrounding community. However, there may be occasions, under extreme weather conditions, where airbourne dust and dustfall could prove to be a nuisance off-site. This should be infrequent and limited to the immediately adjacent areas; however, modelling of average landfill operations potential dust generation does indicate that dust effects could theoretically extend well beyond the site boundaries. These effects can be reduced through temporary changes to site operations (e.g., moving to a more sheltered area of the site and/or suspending some construction activities).

It should also be noted that the quarrying operations and local traffic on the adjacent roadways are more significant sources of dust than the landfill and its operations. Therefore, after the quarry closes in 2001, any nuisance effects from dust should be significantly reduced.

- b) Very sensitive individuals could experience respiratory irritation on occasions of severe weather conditions producing high dust levels. These conditions are expected to be rare, and would only be problematic on-site or immediately adjacent.
- c) People using the proposed playing fields on the closed West Quarry Landfill, or those using Felker's Cemetery, may occasionally experience nuisances with respect to dust, but these should be minor as they are normally upwind of Taro's operations.

The Study Group noted that people's access to the West Quarry park may at times be slowed due to Taro's truck traffic, even though the roadways have the designed capacity to manage the traffic flow. At the suggestion of the community members of the Study Group, Taro is assessing the feasibility of designing a combination entrance/ exit on Highway 20 which could reduce traffic nuisances on First Road West.

For both of these facilities, much of the use will occur outside of Taro's hours of operation, which will further reduce any nuisances experienced.

- d) Property values within 500 m of the site may experience an average impact of 0 to 5%. This does not represent a potential decrease in existing values but the delay of a potential increase in property value until the landfill is closed. It should be noted that Taro has committed to a Property Value Protection Program to offset any impacts. This is currently under negotiation with the Study Group (see Section 12.2).
- e) Limited impacts on businesses within the vicinity of the site due to operational nuisance effects. However, it should be noted that most businesses are compatible as evidenced by their establishment and continued operation near the existing Taro landfill and quarry sites. Over 50% of businesses within 500 m report positive impacts, or no impacts, from the existing operations.

The impact assessment has also concluded a number of positive net effects that will be associated with the East Quarry Landfill:

- a) The landfill will provide a more flexible landform for an urban after use (which will in turn be more compatible with respect to the surrounding urban land uses), compared to minimum rehabilitation of the quarry which would result in a below-grade depression.

- b) The final landform will blend the site back into the rural character of the area and provide a pleasant contrast to the surrounding urban areas, compared to minimum rehabilitation of the quarry which would result in a below-grade depression.
- c) The landfill will provide a necessary and cost-effective service to industries, businesses and institutions in the Region, it will meet part of the waste disposal need for solid, non-hazardous IC&I waste for a 20 year period, and it supports the Region's objective of preserving municipal landfill capacity by the diversion of this type of waste to other facilities.
- d) The landfill will provide the Region and City of Stoney Creek with a net economic benefit from the associated tax revenue.
- e) The construction and operation of the landfill represents an investment of approximately \$28 million in capital, of which \$20 million would be spent in the Region, the creation of eight jobs associated with the landfill, and the continuation/creation of business opportunities servicing the landfill.

The Design and Operations Report, 1995, that accompanies this Environmental Assessment, lays out in detail how the East Quarry Landfill is proposed to be designed and operated. Chapter 11 of the Environmental Assessment (Volume II) traces the evolution of the final design and operations concept and provides a rationale for changes to facility characteristics assumptions. Implications of the changes for impact assessment are also highlighted. Generally the changes made were to further mitigate negative impacts and to enhance positive impacts.

Taro, working closely with the Study Group, the Region of Hamilton-Wentworth, the City of Stoney Creek and the MOEE, has developed an overall impact management plan. Major elements of the plan include Proposed Terms and Conditions, a Property Value Protection Plan and a Community Investment Program. The contents of the impact management plan are presented in Chapter 12 of the Environmental Assessment.

9.0 IMPACT MANAGEMENT

Taro's impact management strategy is closely linked with its ongoing public consultation program. The Study Group, the Region of Hamilton-Wentworth, the City of Stoney Creek and the Ministry of Environment and Energy have all been central to the development of an impact management plan for the site.