

**Town of The Blue Mountains**

**Long Term Solid Waste Disposal Needs**  
**Update Report on Financial Considerations**

Prepared for:

Special Meeting of Council June 20, 2011

## **1.0 Executive Summary**

Within the next few months Town Council will need to make a decision on which long term solid waste disposal option to move forward upon. This report identifies the financial considerations of six solid waste management options. Depending on the option selected the impact on taxation could be from 3.38% to over 7.5% based on cost calculations complete to date. In addition to being financially prudent, the best option for the community should also provide the desired level of service, be environmentally preferred, allow flexibility and be socially acceptable.

## **2.0 Background**

In 2008, the Town initiated an Environmental Screening Process (ESP) which proposed the expansion and mining of The Blue Mountains Landfill (the Site) as the preferred means to address the problem of diminishing disposal capacity, and to provide a long-term environmentally safe solid waste disposal solution for the Town.

Golder Associates Ltd. (Golder) was retained to assist in completing the Environmental Screening Process. The ESP is a comprehensive and environmentally sound planning procedure that incorporates a 12 step screening process including public consultation involving a wide variety of stakeholders.

A consultation process has also been formed with Saugeen Ojibway Nation (SON) under the *Principles for Proponents working in the Traditional Territories of the Saugeen Ojibway Nations*. SON will be conducting a technical review of the landfill expansion/mining ESP. The consultation with SON will seek to find methods to protect and accommodate any rights or interests they may have related to the landfill expansion/mining activities. Similarly, a review of the Screening Report was requested by the Historic Saugeen Metis (HSM). This aboriginal Metis group has identified that The Blue Mountains Landfill Project is within their traditional lands. The HSM have completed their review of the Screening Report and have provided the Town's project with written comments that support the installation of engineered leachate controls, increased monitoring and ongoing consultation that includes the local Metis. Golder is preparing a letter to respond to the comments provided to the project.

To complement the Screening Process, the Town completed in 2008 an *Existing System Summary Report* and a *Waste Diversion Plan*. The goal of the Waste Diversion Plan was to identify initiatives that could capture additional quantities of waste and maximum disposal capacity, while at the same time achieving the provincial target of 60% diversion.

In combination with the ESP, a comprehensive review of estimated costs of both expansion and waste export has been completed by the Town. This report reviews the findings of the financial implications of six waste disposal scenarios. All capital and operational cost factors have been considered. Each scenario has been compared to show a net impact on taxation and a net cost per tonne. With each scenario there are a set of risks and benefits and the impact on taxation ranges. The following discussion is an overview of 2 export and 4 landfill expansion scenarios and includes discussion of scenario details, costs, benefits and risks.

### **3.0 Export Scenarios**

The alternative to expanding the Town Disposal Site is exporting waste to a disposal site outside of the municipality. Town Staff have developed 2 variations on the export option using the financial data gathered in the *Compost Business Case Study* and other available financial and operational information. Although 3 export scenarios were generated this report will look at only 2 in detail. The third option contemplated completely closing the landfill and all transfer and diversion operations at the Site, and only exporting (managing) that waste collected at the curbside. This is not seen as a viable option as it would under-serve the local population, Town operations and the over 7,000 users of the Disposal Site annually. This option, Export Scenario 3, has not been considered any further in the discussion below.

Within the export scenarios considered, the Landfill Site becomes a transfer station for locally generated waste. A transfer station would provide an area to bulk and temporarily hold waste. Once the transfer equipment (trailer or bin) reaches capacity the waste material would be transported off-site to a landfill or other facility outside of the municipality. The scale of the transfer station will depend on the scenario selected. The export scenarios below discuss, in more detail, the components of the transfer stations being considered.

Closure and post closure care have costs that are estimated and updated annually as part of the Site's Annual Report. Closure requirements include application of a cap, drainage and vegetation layer. Post closure care is mainly made up of ongoing ground water and surface water monitoring. The 2010 Annual Report estimated closure costs at \$1,125,600 and an annual post closure care cost of \$28,000. These closure capital and annual costs are included in the financial analysis in Appendix 5.

The ESP contaminate modeling concluded that if remediation does not occur at the Site, an contaminant exceedance will occur. The export scenarios do not deal with remediation in the form of mining and lining and so an alternative remediation measure must be considered. A full geo-synthetic cap at an additional cost of \$3 million may be required to solve the contaminate migration problem. This cost is included in Appendix 5 in the export scenarios as a conservative costing measure and along with the closure capital costs are debt financed over 20 years.

In addition to a standard inflationary rate of 3% on export disposal costs Staff have applied a sensitivity analysis to consider higher cost escalation. If disposal costs escalate at 7% over inflation the cost to export will be surpass Expansion Scenario 2 annual costs in 5.4 years (for example). A conservative value of 4% above inflation on Export Scenario 2 annual costs will surpass annual costs of Expansion Scenario 2 in 9.4 years.

#### **3.1 Export Scenario 1 – Waste Export Municipal and Commercial Waste Management**

This option holds the existing service level at status quo. By building a transfer station and acquiring new waste transfer equipment capable of handling commercial waste, the Town will continue to provide a location for the disposal (in this case transfer) of larger volumes of commercial waste. The system would benefit from the continued waste tipping revenues associated with commercial users.

The cost factors of this option include those associated with waste transport and tipping fees paid for final disposal of curbside and depot collected waste. There would be additional closure and post closure costs for Site capping discussed above. Disposal Site operational costs will be avoided as any landfilling operations will cease. However, some portion of operations will be required to operate the depot area, continued diversion efforts and compost management.

This option involves a higher operational expense than Export Scenario 2 to support the management of the higher level of service and also involves an annual debt repayment cost of \$72,000 for a larger transfer station including a building and equipment.

**Table 1 - Summary of Consideration for Export Scenario 1**

Financially	\$330/ tonne
	External costs are uncertain compared to expansion. Export Scenario 1 net costs are higher than Expansion Scenarios 2 to 4
	Possible requirement to place a high priced (\$3 million) remedial cap on the entire site – without the benefit of new capacity.
	Reduced ability to donate tipping fees to Town and community projects (Town Hall Site – contaminated soil and structures and Medical Clinic Site – Cidery structure)
	Net impact on taxation 6.59%
Operationally	Not a flexible option – once export is selected and landfill is closed, it is very difficult to re-open the site
	Site capacity: 0 years
Environmentally	Not a preferred solution to the issue of off-site contamination
	Public had an aversion to an export option during consultations and preferred a local waste management option

### **3.2 Export Scenario 2 – Waste Export Residential Management Only**

This option contemplates the management of municipal waste only (primarily residentially generated). Larger private and commercial haulers would be excluded from using the municipal Site for waste transfer. Smaller loads capable of using the existing Site receiving area will continue to be accepted under this option. The issue of management of commercial waste becomes more of a question of the desired service provision. Tipping rates can be set to fully recover the cost of the commercial portion of waste being managed through an export system. However, setting full cost recovery rates may also deter Site use which could lower revenue while all the operational costs of operating a transfer station are still in place. The final setting of cost splitting between fees and general taxation will need to be explored and considered.

Export Scenario 2 does not include the construction of a new transfer station building and tipping floor and instead proposes to use the existing bins and receiving area to store and ship the smaller quantities of depot-collected residential and light commercial waste. Curbside and multi-unit waste collected by the Town’s contractors would be shipped directly from curbside to the contractor’s transfer station or landfill, whichever the case may be.

Export Scenario 2 involves the same remediation, post closure and closure costs and fee consideration as within Export Scenario 1.

**Table 2 - Summary of Consideration for Export Scenario 2**

Financially	\$263/ tonne
	External costs are uncertain compared to expansion – sensitivity analysis shows that export costs could exceed expansion costs in 9.4 years at 4% above inflation
	Without a transfer building, the Town will be in an inflexible situation even more than in Export Scenario 1 because the Town will have no means to bulk-ship waste and will rely heavily on waste hauling contractors
	Possible requirement to place a high priced (\$3 million) remedial cap on the entire site – without the benefit of new capacity
	Reduced ability to donate tipping fees to Town and community projects (i.e.: Town Hall Site – contaminated soil and structures and Medical Clinic Site – Cidery structure)
	Net impact on taxation 4.54%
Operationally	Not a flexible option – once export is selected and landfill is closed, it is very difficult to re-open the Site
	Site capacity: 0 years
Environmentally	Not a preferred solution to the issue of off-site contamination
	Public had an aversion to an export option during consultations and preferred a local waste management option

#### **4.0 Expansion Scenario Development**

The Environmental Screening Process generated 4 possible landfill expansion scenarios plus a “Do Nothing” option. The “Do Nothing” option has largely been adapted into an export option, as doing nothing is not a real option for solid waste disposal.

The 4 landfill expansion options developed by Golder are described below. The Figures 8 – 11 in the appendices show how the scenarios will be undertaken specific to The Blue Mountains Site layout. All the expansion scenarios, excluding 4, involve what is termed as landfill mining. This process entails excavating areas within the Site that were previously closed. As waste is excavated, bulky salvageable material is set aside for processing or recycling. Excavated material will be run through a trommel screen and separated into fine and coarse (overs) fractions. Coarse material is taken to the active face for disposal, whereas fine material will be stockpiled and re-used as operational cover material.

Mining offers two main opportunities: site remediation and new disposal capacity. Additional disposal capacity gained from the mining process is obtained largely as a result of using the screened fines as cover material, offsetting the need to import new cover material.

Mining also increases disposal capacity by providing opportunity to remove recyclable materials, remove and reduce the size of oversized waste items, and improve waste compaction during re-landfilling of waste overs. For the purpose of developing the scenario volumes, it was assumed that the in-place waste at the Site would consist of 40% waste overs to a 60% fines component.

Mining facilitates the re-engineering and remediation of the previously unlined areas of the landfill. The current landfill design is a natural attenuation facility. Natural attenuation refers to the reduction of landfill contaminant concentrations in the environment over time or distance through naturally occurring physical, chemical and biological processes. Annual monitoring well testing is showing elevated nitrate and sulphate concentrations to the east of the landfill operations. There is a concern based on the groundwater flow models developed for the ESP, that the proximity of the landfill to the Indian Brook does not allow enough natural attenuation distance. However, the installation of an engineered lining and leachate collection system, as proposed in Scenarios 1 to 3, provides groundwater and surface water protection and is compliant with current landfill standards.

Scenario 4 and all the export scenarios do not consider the remediation of the “Thornbury/The Blue Mountains East” portion of the landfill as discussed above through mining and lining. Consequently those scenarios will carry the risk of continued or increased contamination of adjacent groundwater, especially in the case of Scenario 4 that adds more waste to the Site. This same risk will be present in part for Scenario 3, which contemplates remediating only the Thornbury section of the existing landfill.

The financial calculations in this report have been created based on the idea of not taking large bulk deliveries of commercial waste. This has been considered to show the full potential life of the new capacity and to understand the base cost waste disposal for the taxpayer. Council will need to give further consideration to the concept of accepting commercial waste, what types and how much the commercial rate may be subsidized.

All of the expansion scenarios involve a leachate collection system. This system will include a series of pipes that will be gravity drained to a storage well. From a manhole access the leachate will be pumped into a truck and transported to the Town’s sewage treatment plant. The operational cost of managing leachate includes transportation and treatment.

#### **4.1 Scenario 1 – Northern Expansion and Mining of Thornbury/ Blue Mountains**

This scenario proposes that a new landfill cell (Area 1 on Appendix 1) will be constructed to the north and west of The Blue Mountains Landfill and Thornbury Landfills respectively and will provide a total additional disposal capacity of 100,000 m<sup>3</sup>. This will increase the current waste disposal capacity of the Site from 370,000 m<sup>3</sup> to 470,000 m<sup>3</sup>. The approximate dimensions of the new proposed cell are 170 m long by 100 m wide, with a fill depth of approximately 6 m below the existing grade.

Following the completion of the new cell (Area 1 on Figure 8 of Appendix 1), mining of the old Thornbury Landfill and the eastern side of The Blue Mountains Landfill (Area 2) will commence.

The proposed volume to be mined is 200,000 m<sup>3</sup>; with the newly constructed northern landfill cell (Area 1) to be utilized for the landfilling of the waste reclamation overs (screened waste) and new waste arriving at the Site. Approximately 120,000 m<sup>3</sup> of fines will be produced during the mining process. Fines will be stockpiled within the landfill footprint and used as daily and interim cover during landfilling of new incoming waste and waste overs.

It is assumed that mining of the Thornbury and eastern The Blue Mountains Landfill would be conducted over a 2 year period. The mining process will utilize screening equipment capable of 750 m<sup>3</sup>/day and a 5 day working week during March to September.

The newly constructed northern cell (Area 1) will be utilized for the re-landfilling of approximately 100,000 m<sup>3</sup> of waste overs and fines from the mining process and will reach capacity around the completion of mining operations. However, the lining and leachate collection system works in this scenario will take a year to complete. As a result, mining can not commence because there will be no location to place the overs. In addition, new capacity for new incoming waste will not be available until a year later than Scenario 2 and 3. This delay may complicate the construction and approvals and may result in the need to export waste if the existing or even any emergency capacity runs out.

The waste in the area to be mined is between 15 and 35 years old. The contamination loading of reclaimed waste is less than that of new waste material, thereby making it more suitable for placing over the existing unlined portions of the Site (vertical expansion). From a net environmental loading perspective, the cells with liner and leachate collection systems should be used for the waste material with the highest contaminant loading.

**Table 3 - Summary of Considerations for Scenario 1**

Financially	\$365/Tonne
	Most expensive construction option, because it involves creating two lined cells
	Higher leachate treatment cost annually due to additional lined cell
	Net impact on taxation 7.67%
Operationally	Site capacity 17 – 40 years (depending on commercial quantities received)
	New disposal capacity will be delayed compared to Scenarios 2 and 3 that utilize vertical lift expansion
	Long site life creates a manageable planning horizon – the potential shorter site life of Scenario 3 and more so 4 create an ongoing approvals process
Environmentally	Creating a lined expansion area has no net environmental advantage over the expansions that utilize a vertical lift.

## 4.2 Scenario 2 – Vertical Expansion and Mining Thornbury / Blue Mountains

This Scenario is similar to Scenario 1, but proposes a 100,000 m<sup>3</sup> vertical expansion of the existing The Blue Mountains Landfill (Area 1 on Appendix 2) in place of constructing a new cell outside the existing landfill footprint. The area of the vertical expansion is estimated to be approximately 5.5 hectares which would result in a 1.8 m to 2 m lift across the western part of Area 1.

Identical to Scenario 1, mining of the waste in the Thornbury Landfill and the eastern side of The Blue Mountains (Area 2) will be completed over a two year period, but will commence immediately as the reclaimed overs will be placed in the vertical lift Area 1. The proposed mining volume is 200,000 m<sup>3</sup>.

Similar to the Scenario 1 sequence of events, landfilling of incoming municipal waste will move to the mined areas once the 100,000 m<sup>3</sup> vertical expansion has been filled with waste overs and fines from the mining work.

A benefit of Scenario 2 is the vertical expansion. A vertical expansion will save the project time and money over the Scenario 1 that proposes a northern site expansion. Placing waste as a vertical lift on top of The Blue Mountains completed section avoids the cost of building a lined expansion and avoids the 12 month time delay to build a lined expansion area. Placing the reclaimed waste in a vertical lift still offers good environmental protection over placing reclaimed waste in a lined expansion. Considering the additional \$1,164,500 required to construct Scenario 1 (along with new capacity that will be ready sooner), Scenario 2 appears to be a more cost effective choice while offering the same net environmental benefit and new site life.

**Table 4 - Summary of Considerations for Scenario 2**

Financially	\$315/Tonne
	Second most expensive construction cost however also has the longest estimated site life allowing a longer amortization compared to Scenario 1 that has a higher cost with the same life span.
	Lower leachate management cost than Scenario 1
	Net impact on taxation 6.14%
Operationally	Site capacity 17 – 40 years (depending on commercial quantities received)
	Vertical expansion allows new disposal capacity to be available as soon as approvals are complete
	Long site life creates a manageable planning horizon – the potential shorter site life of Scenario 3 and more so 4 create an ongoing approvals process
Environmentally	Lining of Thornbury and eastern The Blue Mountains area will act to protect the groundwater and surface water from contamination and create an improvement over existing situation
	Some concerns with the visual impact of the vertical lift
	Vertical lift has a reduced cost over Scenario 1 and offers the same level of environmental protection as a lined expansion

### **4.3 Scenario 3 – Vertical Expansion and Mining of Thornbury**

This Scenario proposes to undertake reclamation of only the Thornbury Landfill (Area 1 on Figure 10 of Appendix 3) over a one year period. Scenario 3 is a vertical expansion of the Site, Wherein reclamation is only undertaken with the purpose of addressing the contaminants believed to be originating from the Thornbury Landfill.

The proposed reclamation volume will be approximately 100,000 m<sup>3</sup>, which is the estimated volume of the Thornbury Landfill. This Thornbury reclamation will result in 40,000 m<sup>3</sup> of waste overs.

Similar to Scenario 2, a vertical expansion would extend over Area 2 and would require a 1.5 m lift. This vertical expansion will be utilized for waste overs from the Thornbury mining process including new incoming waste. Once the vertical expansion capacity is reached landfilling of municipal waste will move to the re-engineered Thornbury location.

Scenario 3 offers much the same as Scenario 2 does over Scenario 1; however the anticipated site life is 6 to 8 years shorter. Mining a smaller portion of the landfill (Thornbury only) results in less new capacity and creates more environmental risk over the scenarios that fully mine and line the eastern portion of the Site. This environmental risk translates into more remediation costs to ensure the potential for off-site contamination is corrected. To account for this the financial analysis has included the cost of installing a geo-synthetic over the remainder of the east portion of the Site at a cost of \$500,000.

**Table 5 - Summary of Considerations for Scenario 3**

Financially	\$226/Tonne
	Second least expensive construction cost however also has the second shortest estimated site life.
	Lowest annual leachate management costs (same as Scenario 4)
	Additional remediation costs drive up net costs
	Net impact on taxation 3.38%
Operationally	Vertical expansion allows new disposal capacity to be available as soon as approvals are complete
	By the time this project is complete the Town will need to begin the process of planning for additional disposal capacity
	Site Capacity 11 – 32 years (depending on commercial quantities received)
Environmentally	Lining of Thornbury area will act to protect (part of) the groundwater and surface water from contamination a partial geo-synthetic cap will be required in addition to the remediation of the Thornbury area
	Some concerns with the visual impact of the vertical lift

#### **4.4 Scenario 4 – Landfill Expansion Only**

This option involves the construction of a new landfill cell (Area 1 on Figure 11 of Appendix 4) to the north and west of the Blue Mountains and Thornbury Landfills, respectively, containing a total disposal capacity of 100,000 m<sup>3</sup>. The approximate dimensions of the new proposed cell are 170 m long by 100 m wide, with a fill depth of approximately 6 m below the existing grade. The completed cell will be at similar grades to the current design and will not change the Site profile.

Scenario 4 is the low cost expansion option, which gives no consideration to mining. A point of consideration for Scenario 4 and to some degree Scenario 3 is the relatively short life expectancy of the associated expansion. Due to the lead time required for landfill expansion projects, by the time this project is constructed a new expansion planning process would need to begin. In addition, the Town can expect the next approvals process to escalate into an Environmental Assessment Act process versus the Environmental Screening route. It should furthermore be expected that the cost of an Assessment Act related expansion will be expensive. The cost of the subsequent expansion, or exporting for that matter, is not included in the cost analysis completed to date.

Not placing a focus on remediation of the Thornbury area adds additional remediation costs to the scenario. Elevated contaminants are believed to be originating from the Thornbury area in the Site. Without mining and remediating there is an identified risk of contaminate migration continuing. Currently Scenario 4 is carrying a \$3 million capital cost for remedial work, this remedial cost is applied to the export scenarios as well.

**Table 6 – Summary of Considerations for Scenario 4**

Financially	\$302/Tonne
	The least expensive construction cost however also has the shortest estimated site life.
	By the time this project is complete the Town will need to immediately begin the process of planning for additional disposal capacity.
	Lowest annual leachate management costs (same as Scenario 3)
	Addition remediation costs drive up net costs
	Net impact on taxation 5.73%
Operationally	Site capacity 7 - 13 years (depending on commercial quantities received)
	New disposal capacity will be delayed compared to the Scenarios (2 and 3) that utilize vertical lift expansion
Environmentally	Not mining and lining the older portion of the Site does not deal with the contaminate issue that is originating from that area. Remedial action will be required in addition to expansion but without the benefit of additional landfill space

## **5.0 Review of Scenario Costs**

The following section is a detailed cost review of all 6 scenarios and is detailed on Appendix 5. This table identifies net impact on taxation in 2012 and a cost per tonne related to waste disposal. The table shows estimated landfill life and total annual waste tonnage, which excluded commercial sector waste tonnages. It must be kept in mind that costs beyond the life of the expansion have not been included and as such the scenarios are not cost on a common timeline but instead consider the 2012 taxation rate increase.

### **5.1 Estimated Annual Volumes**

Appendix 5 identifies the cost of scenarios and the estimated waste quantities for 2012 based on current curbside collection and Site data. The total tonnage excludes commercial waste to understand the full cost to taxation for municipal waste disposal. The proposed expansion is measured in cubic metres. To understand how many years capacity the expansion will provide, the annual tonnage is converted to an annual volume. Tonnage is converted to volume through a kilogram per cubic metre compaction rate. New expansion operations must achieve a higher rate of compact than is currently being accomplished. The rate used in Appendix 5 is 700 kg/m<sup>3</sup>, which is below the high end of the industry standard. The estimated landfill lifecycle is a function of estimated annual waste tonnage, compaction rate and proposed expansion capacity.

Exclusion of commercial waste tonnage has been done to accurately determine the cost per tonne for the portion of waste the municipality is required to manage (residential). Continuing to accept commercial waste will reduce the site life and impact the cost per tonne, if commercial waste is accepted at a subsidized rate. For example: if a scenario is selected that has 40 years capacity and commercial waste is accepted in addition to the residential waste the life of the Site could be reduced to 20 years. Additionally if commercial waste is not charged the identified net cost per tonne, taxation will subsidize commercial waste disposal. The result of accepting commercial waste at a cost lower than the identified net cost per tonne, is an accelerated debt repayment schedule because as more waste is received the site life is shortened.

### **5.2 Annual Variable Costs**

The costs vary depending on the scenario. The depot diversion and waste disposal costs are related to operational costs. In the case of export scenarios, costs are largely tippage fees. In addition to operations associated with waste compaction and facility maintenance in the expansion scenarios, are leachate treatment costs during operations and the establishment of a reserve for post closer leachate treatment. The export scenarios do not have leachate treatment costs.

The capital costs in the annual variable costs deal with debt repayment. Debt repayment is a function of estimated landfill lifecycle and construction costs under each different scenario. Table 7 below shows the variation in construction cost of the expansion scenarios. These variations in costs highlight the differences in the debt repayment for each expansion scenario. Depending on the extent and type of construction proposed under each scenario, the construction costs will vary.

**Table 7 - Scenario Construction Cost Comparison**

<b>Description</b>	Scenario 1 Northern Expansion and Mining of Thornbury and TBM east	Scenario 2 Vertical Expansion of TBM and Mining of Thornbury and TBM east	Scenario 3 Vertical Expansion and Mining of only Thornbury	Scenario 4 Northern Expansion
<b>Expansion Volume (m<sup>3</sup>)</b>	100,000	100,000	100,000	100,000
<b>Mining Volume (m<sup>3</sup>)</b>	200,000	200,000	100,000	0
<b>Estimated Net Capacity Gain (m<sup>3</sup>)</b>	180,000	180,000	151,000	100,000
<b>Expansion Cost</b>	\$1,164,500	\$0	\$0	\$1,164,500
<b>Mining Cost</b>	\$4,120,000	\$4,120,000	\$2,063,000	\$0
<b>Re-Engineering Mined Cells Cost</b>	\$2,492,000	\$2,612,000	\$1,214,500	\$0
<b>Engineering Allowance</b>	\$933,180	\$808,920	\$393,300	\$139,740
<b>Total Cost</b>	\$8,709,680	\$7,549,920	\$3,670,800	\$1,304,240

### **5.3 Remedial Costs**

As discussed in the scenario descriptions, if an expansion option that does not include full remediation or export is selected, an additional remedial capital cost is factored into the scenario. This cost accounts for remediating the contaminate migration issue that exists at the Site. Scenarios 1 and 2 work to resolve the contaminate issue as part of the capacity creation work. Scenario 3 resolves the issue only in part and Scenario 4 and Export Scenarios 1 and 2 do not work to resolve the contamination issue. The remedial cost line in Appendix 5 accounts for the capital cost spread over 20 years of installing a full geo-synthetic liner.

The net cost per tonne for disposal is a function of operational costs and amortized capital costs and the total tonnage of municipal waste to be managed (and not including commercial tonnage).

Appendix 6 *Landfill Expansion and Waste Management Options* shows the comparison of total estimated system costs in 2012 for all 6 scenarios and the percent impact to taxation that the additional costs create. The bar and line graph is generated from the table on Appendix 5. The bottom three components of each bar in Appendix 6 are fixed costs regardless of the system selected. Appendix 6 emphasizes the variations in waste disposal operational costs and capital repayment costs over each scenario.

It is critical that consideration is given to factors beyond the bottom line impact on taxation. As discussed in sections above, although some options such as Export Scenario 2 will have a lower impact on taxation than some of the other scenarios, a decreased level of service to the public and commercial user will also be associated with that option.

Similarly, Expansion Scenario 4 shows a lower cost per tonne against other expansion scenarios however, the related site life (7-13 years) is insufficient and its selection would result in an almost immediate need to undertake another Environmental Assessment process for a future expansion.

## **6.0 Risks, Benefits and Other Considerations**

A bottom line cost should not be the only consideration in selecting the preferred scenario. There are a number of risks, benefits and other factors to consider. Below is a discussion of these factors to consider under a number of topics.

### **6.1 Waste Management Responsibilities**

Municipalities are required to manage only residentially generated waste. The Town can benefit from accepting commercial waste at the landfill or transfer station, however it will decrease the site life and if full cost fees are not collected, taxation will subsidize commercial waste management. Under the current cost analysis, use of the Site by light commercial and “weekend” haulers is factored in however their tip fees should be full cost recover.

### **6.2 Site Life and New Approvals**

If a Scenario such as 4 is selected that has only 13 years of expected life, almost as soon as the site is constructed the Town will need to start a new Environmental Assessment Process. The current process under the simplified Environmental Screening will take 7 years from initiation to end of construction. In all likelihood the Town Site would not be able to consider conducting another environmental screening and would be forced to step up to a full Environmental Assessment Act process. In addition, providing commercial sector disposal at current volumes will shorten the 13 years of life to 7.

A longer expansion life will provide a more suitable planning horizon.

### **6.3 Remediation**

Annual monitoring is showing Site boundary contamination issues. Only Scenarios 1 and 2 contemplate the desired Site remediation by mining and lining the full width of the east end of the existing Site. Scenario 3 does offer part remediation, but will leave a large section of the east area unlined. The financial evaluation (Appendix 5) conducted by Town Staff does include a remedial cost of \$3 million for Scenario 4 and the export scenarios financed over 20 years. A \$500,000 cost is included for scenario 3.

### **6.4 Ministry of the Environment Prospective**

The Ministry of the Environment (MOE) has reviewed a pre-submission (submitted in 2010) version of the ESP with a particular technical focus on the groundwater models. A letter dated January 2011 from the MOE advised the Town that the MOE is satisfied with the modeling and the report, particularly given the intention to fully line the facility. They also have stated they have no further hydrogeological issues at this point in the ESP. This response is a positive development towards gaining environmental assessment approval. The related and important consideration is the threat of increased offsite groundwater contamination believed to be originating from the Thornbury Landfill area.

Although the Town has acquired a contaminate attenuation zone to the north and east of this area, the recent modeling and study completed has identified that further contamination will occur and contamination could also reach the adjacent Indian Brook. If an expansion Scenario is selected (such as Scenario 4) that does not include mining and lining of the Thornbury Landfill area, a particular amount of risk will be taken on by the Town. Selecting an option that expands the Site and mines the east portion of the Site allows a level of protection against offsite contamination and provides new landfill capacity in one project.

### **6.5 Expansion Cost Over Runs**

There is always a risk that construction and engineering costs may over run the estimates being used for the analysis; conversely costs could be lower. In any case the decision will remain with the Town to scale back or move forward as the cost the costs become better understood and known.

### **6.6 Inflexible Platform**

If the Town completely abandons an expansion scenario, the ability to make restraint free decisions will be limited. An export scenario will confine the Town to one option. Once the Landfill is closed the ability to return to a site expansion option will be limited if not prohibited.

### **6.7 Loss of Cost Control**

Selecting an expansion scenario keeps most of the costs within municipal control versus an export scenario that will rely on contracted waste transport and disposal. Many unknown cost increases could occur in an export scenario related to: fuel prices; border closures; or tip fee increases based on a market change or a reduction in the provincially available capacity. The sensitivity analysis run on Export Scenario 2 shows a significant increase in costs if a high inflation rate is experienced on the export operational costs. At an inflation rate of 7% above the standard rate, Export Scenario 2 costs would surpass Expansion Scenario 2 costs in 5.4 years. A conservative value of 4% above inflation on Export Scenario 2 annual costs will surpass annual costs of Expansion Scenario 2 in 9.4 years.

Keeping costs internal will allow the Town to better manage costs and work at finding savings.

### **7.0 Finding Savings**

As discussed, moving forward with an expansion option keeps the costs internal, which will allow for the potential to develop funding and cost saving measures. Currently the cost model anticipates debt financing all of the construction costs.

### **7.1 Gas Tax and Grants**

There will be an opportunity to consider the use of Federal Gas Tax to offset costs, the Town also has a waste management reserve of \$430,000. There may also be better opportunity to be eligible for various infrastructure grants if the solution involves improvements to the local waste infrastructure.

## **7.2 Leachate Plant**

Leachate treatment and haulage is a relatively large single cost for Expansion Scenario 1 and 2. This cost of between \$315,000 and \$220,000 annually for 40 years adds up to between \$9 and \$13 million capital cost. In addition there will be post-closer leachate treatment costs. Staff have given consideration to building a small treatment plant on-site. Under Scenario 3 and 4 an on-site plant may not be affordable due to lower leachate generation. However, in all of the expansion scenarios an option to own and operate a Town leachate haulage truck may prove to be more economical and effective to take leachate to the Wastewater Plant. An investigation of a small leachate plant at a Perry Sound waste facility identified a recent plant construction cost of \$2 million. This option will be researched further to discover if there are cost saving for leachate treatment over haulage to the Wastewater Plant.

## **7.3 Waste Compaction**

Setting up a compaction contract that has penalties and incentives to maintain 700kg/m<sup>3</sup> will work to improve site performance and extend site life. This will also be compared against operating compaction efforts in-house with Town owned compaction equipment.

## **7.4 Diversion**

Continued operations of a Town disposal site will better position the Town to examine increased diversion efforts that will work to extending the site life. Any diversion effort can be compared on a cost per tonne basis to disposal to understand the financial viability. Town Staff will bring forward diversion proposals with the objective to save money by extending site life and displaying a reduced cost per tonne over landfilling.

## **8.0 Contingency**

As the ESP moves forward the existing landfill capacity is being consumed and may be depleted before new approvals are in place. A number of contingency measures need to be considered and three main options, with risks for meeting timelines and financial implications, are outlined below.

**Table 8 – Contingency Considerations**

Option	Tonnage Gained/ Time Gained	Cost	Risk
Export Curbside and Multi-unit waste	One year of curbside export results in a reduction of 1900 tonnes or an equivalent of 5 months of landfill space	\$170,052/year	- Unfinanced additional costs for the collection system
Ban Industrial, Commercial and Institutional Disposal at landfill	One year of a ban on IC&I results in a reduction of 1726 tonnes or an equivalent of 4 months	\$114,780/year	- Loss of revenue will result in additional net disposal costs
Apply for Emergency Certificate of Approval	18 month extension	\$6,000	- Approval not in place before end of existing capacity

Considering the current understanding of the timeline as outlined in Appendix 7, there is a gap between the estimated existing capacity depletion date and the potential start date for new disposal capacity construction. An emergency certificate of approval (CoA) would allow the Town to stockpile waste at the existing Site essentially increasing the height of the existing final contours. An emergency approval is not uncommon and is typically granted to proponents that are in the process of securing new capacity. The MOE has informed Town Staff that the Town can apply for an emergency CoA at any time. The MOE review period on an emergency CoA is six months. This time line would allow for the Town to obtain, before the estimated existing final capacity is reached, an emergency capacity of 18 months. A contingency plan that involves applying for the emergency CoA will be the least disruptive to existing operations, to Site access and financially.

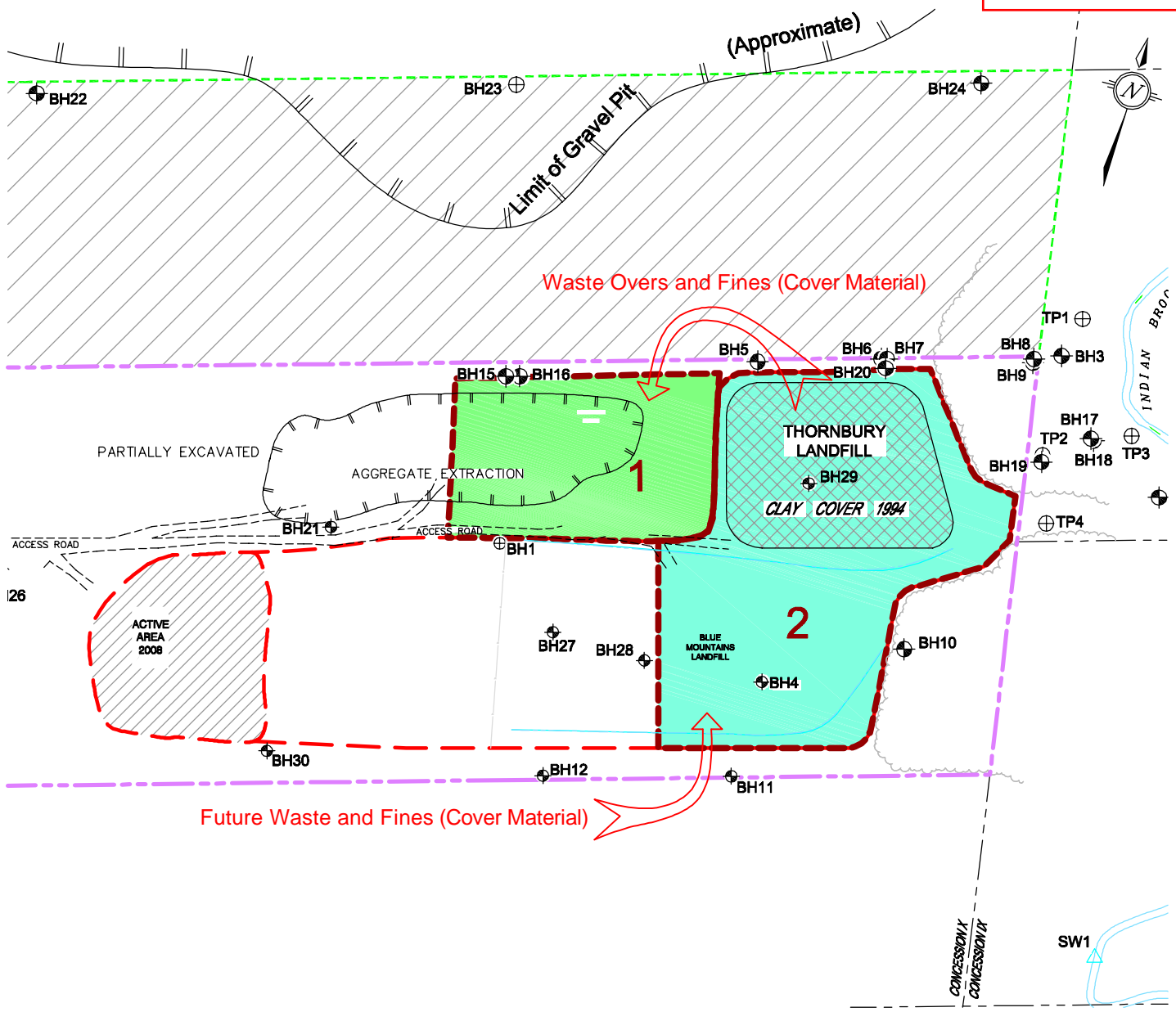
## **9.0 Next Steps**

The ESP is at a critical stage, for timing and decision making. The timing aspect is highlighted in the attached Appendix 7. The First Nation’s review work will ideally be completed before the Town publishes the Notice of Completion in December of this year. Additionally, the Town should begin the process of applying for an emergency CoA within the next few months to ensure capacity is available up until new capacity is constructed. In the case of Expansion Scenario 1 and 4, available space will not be ready for a year following the start of construction due to the time that is required to construct the new lined cells.

Further consideration, by Council, will need to be given to commercial waste management to assist with more detailed cost comparison work to refine the figures. This report is a current understanding of the costs with assumptions made about commercial waste service.

Other financial work will need to be conducted by Staff to understand on-site leachate treatment costs versus haulage. However, this decision is somewhat independent of the expansion scenario decision and will involve a separate approvals process for any proposed leachate treatment plant.

Town Staff plan to hold a Public Information Centre (PIC) on the financial considerations within the next two months. Council can use the feed-back gathered from the PIC, this report and other consultation completed and ongoing to identify a preliminary decision on which scenario to move forward. That preliminary decision will be presented to Committee and Council for final approval, after which a Notice of Completion can be published.



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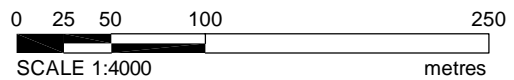
- SITE BOUNDARY
- APPROX. LIMIT OF LANDFILL
- ATTENUATION BOUNDARY
- SURFACE WATER
- ▲ SURFACE WATER SAMPLING LOCATION
- ⊕ EXISTING MONITORING WELL
- ⊙ ABANDONED MONITORING WELL
- PRIVATE WELL
- XXXXXX FINAL COVER
- / / / / ATTENUATION ZONE
- / / / / ACTIVE AREA

**SCENARIO 1:**

- 1 EXPANSION AREA
- 2 MINING AREA

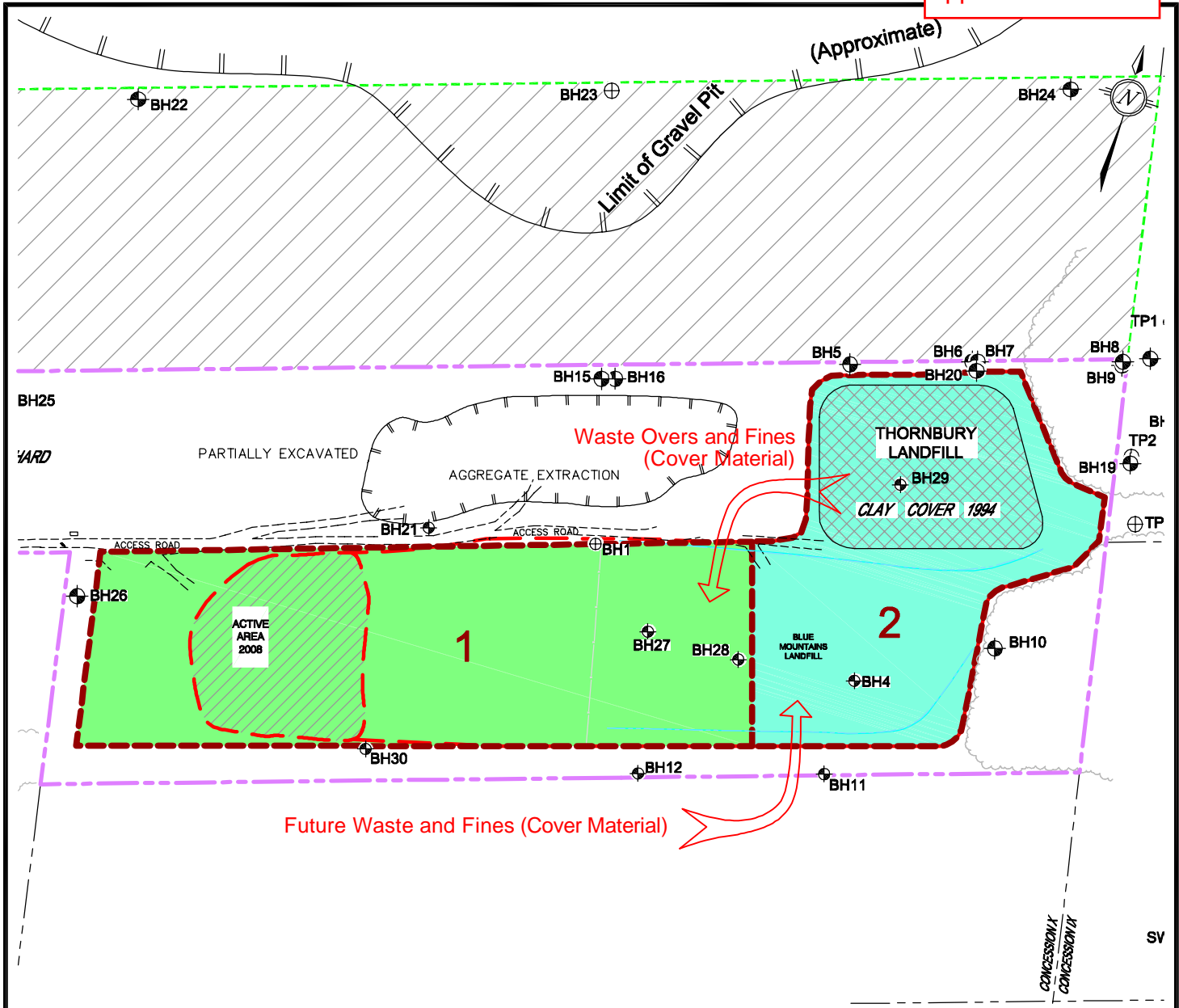
**REFERENCES:**

1. AutoCAD BASE COURTESY RJ BURNSIDE ASSOCIATES LTD. 2007
2. STOCKPILE LOCATION & OTHER GENERAL FEATURES APPROXIMATE.



PLOT DATE: August 5, 2010  
FILENAME: T:\Projects\2008\08-1182-0085 (Blue Mountains Landfill Investigations)\CC-0811820085CCPLAN1.dwg

<p><b>Golder Associates</b> Barrie, Ontario, Canada</p>	SCALE AS SHOWN	<h1 style="margin: 0;">SCENARIO 1</h1>	
	DATE 05 AUG 2010		
	DESIGN		
	CAD J REGIER		
FILE No. 0811820085CCPLAN1.dwg	CHECK	<p><b>THE BLUE MOUNTAINS LANDFILL MINING AND EXPANSION ENVIRONMENTAL SCREENING PROCESS</b></p>	FIGURE
PROJECT No. 08-1182-0085 REV.	REVIEW		<h2 style="margin: 0;">8</h2>



**LEGEND:**

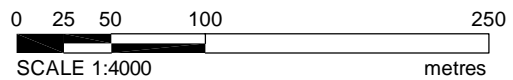
- SITE BOUNDARY
- APPROX. LIMIT OF LANDFILL
- ATTENUATION BOUNDARY
- SURFACE WATER
- SURFACE WATER SAMPLING LOCATION
- EXISTING MONITORING WELL
- ABANDONED MONITORING WELL
- PRIVATE WELL
- FINAL COVER
- ATTENUATION ZONE
- ACTIVE AREA

**SCENARIO 1:**

- 1 VERTICAL EXPANSION AREA
- 2 MINING AREA

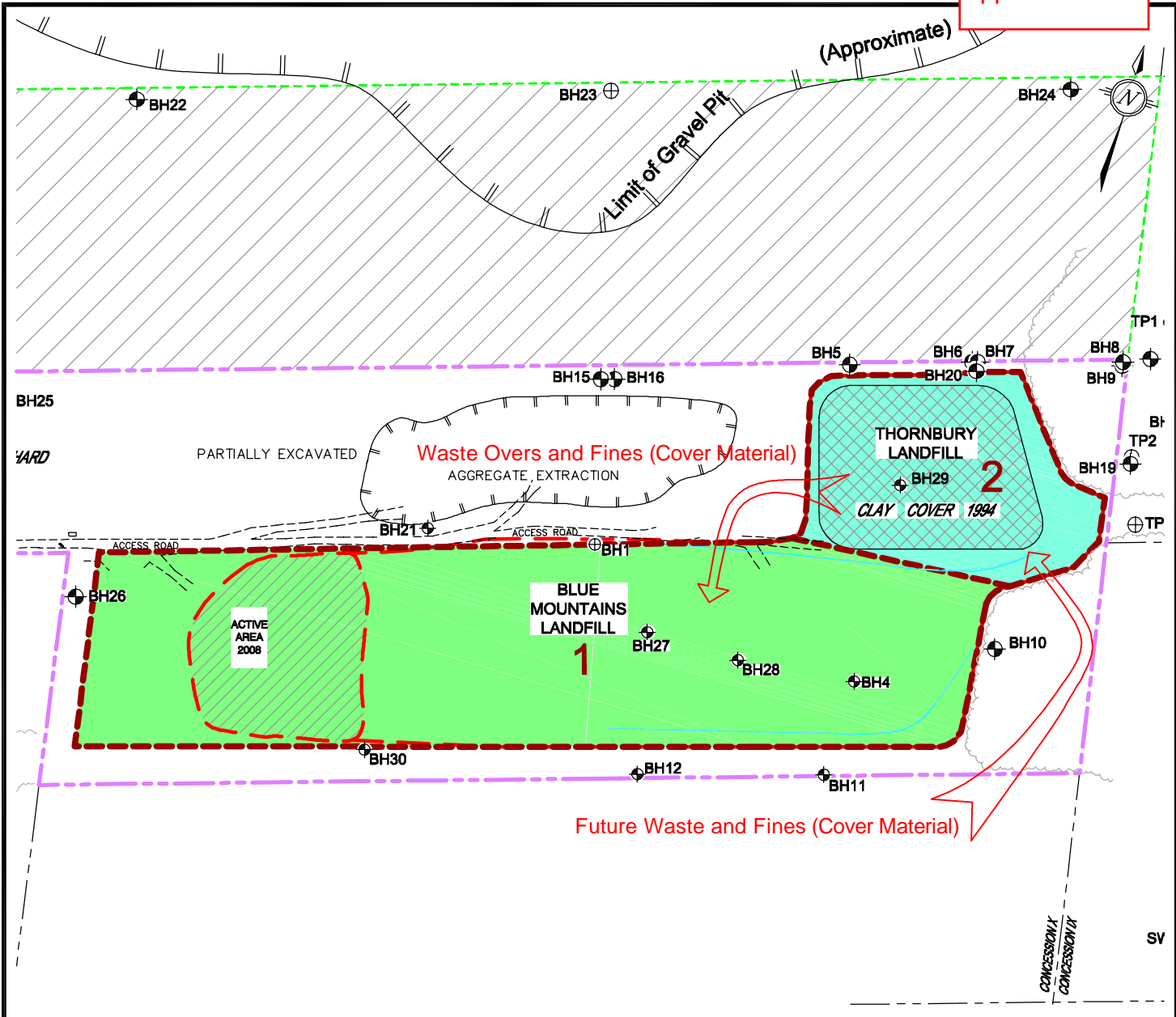
**REFERENCES:**

1. AutoCAD BASE COURTESY RJ BURNSIDE ASSOCIATES LTD. 2007
2. STOCKPILE LOCATION & OTHER GENERAL FEATURES APPROXIMATE.



PLOT DATE: August 5, 2010  
FILENAME: T:\Projects\2008\08-1182-0085 (Blue Mountains Landfill Investigations)\CC-0811820085CCPLAN2.dwg

<p><b>Golder Associates</b> Barrie, Ontario, Canada</p>	SCALE AS SHOWN	<h1>SCENARIO 2</h1>	
	DATE 05 AUG 2010		
	DESIGN		
	CAD J REGIER		
FILE No. 0811820085CCPLAN2.dwg	CHECK	<p><b>THE BLUE MOUNTAINS LANDFILL MINING AND EXPANSION ENVIRONMENTAL SCREENING PROCESS</b></p>	FIGURE
PROJECT No. 08-1182-0085 REV.	REVIEW		<b>9</b>



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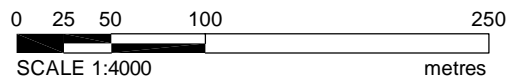
- SITE BOUNDARY
- APPROX. LIMIT OF LANDFILL
- ATTENUATION BOUNDARY
- SURFACE WATER
- △ SURFACE WATER SAMPLING LOCATION
- + EXISTING MONITORING WELL
- ⊕ ABANDONED MONITORING WELL
- PRIVATE WELL
- FINAL COVER
- ATTENUATION ZONE
- ACTIVE AREA

**SCENARIO 1:**

- 1 VERTICAL EXPANSION AREA
- 2 MINING AREA

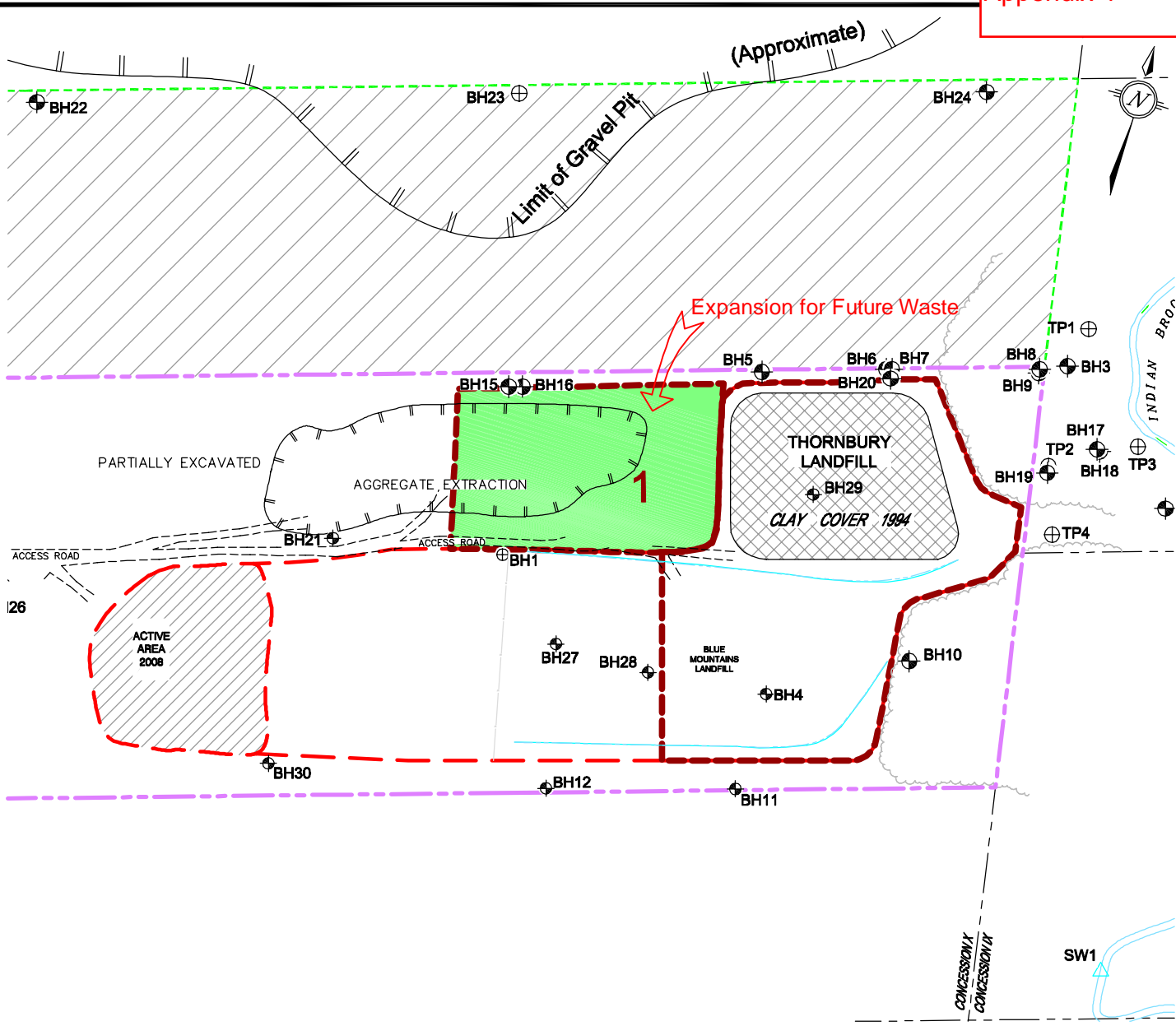
**REFERENCES:**

1. AutoCAD BASE COURTESY RJ BURNSIDE ASSOCIATES LTD. 2007
2. STOCKPILE LOCATION & OTHER GENERAL FEATURES APPROXIMATE.



PLOT DATE: August 5, 2010  
FILENAME: T:\Projects\2008\08-1182-0085 (Blue Mountains Landfill Investigations)\-CC-0811820085CCPLAN3.dwg

 <b>Golder Associates</b> Barrie, Ontario, Canada	SCALE	AS SHOWN	SCENARIO 3
	DATE	05 AUG 2010	
	DESIGN		
	CAD	J REGIER	
FILE No.	0811820085CCPLAN3.dwg		THE BLUE MOUNTAINS LANDFILL MINING AND EXPANSION ENVIRONMENTAL SCREENING PROCESS
PROJECT No.	08-1182-0085	REV.	
		REVIEW	FIGURE 10



**LEGEND:**

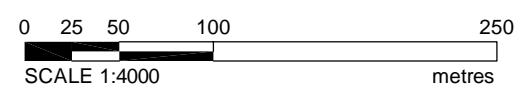
- SITE BOUNDARY
- APPROX. LIMIT OF LANDFILL
- ATTENUATION BOUNDARY
- SURFACE WATER
- ▲ SURFACE WATER SAMPLING LOCATION
- ⊕ EXISTING MONITORING WELL
- ⊕ ABANDONED MONITORING WELL
- PRIVATE WELL
- FINAL COVER
- ATTENUATION ZONE
- ACTIVE AREA

**SCENARIO 1:**

- 1 EXPANSION AREA

**REFERENCES:**

1. AutoCAD BASE COURTESY RJ BURNSIDE ASSOCIATES LTD. 2007
2. STOCKPILE LOCATION & OTHER GENERAL FEATURES APPROXIMATE.



PLOT DATE: August 5, 2010  
FILENAME: T:\Projects\2008\08-1182-0085 (Blue Mountains Landfill Investigations)\CC-0811820085CCPLAN4.dwg

 <b>Golder Associates</b> Barrie, Ontario, Canada	SCALE AS SHOWN	<h2 style="margin: 0;">SCENARIO 4</h2>	
	DATE 05 AUG 2010		
	DESIGN		
	CAD J REGIER		
FILE No. 0811820085CCPLAN4.dwg	CHECK	<b>THE BLUE MOUNTAINS LANDFILL MINING AND EXPANSION ENVIRONMENTAL SCREENING PROCESS</b>	FIGURE
PROJECT No. 08-1182-0085 REV.	REVIEW		11

SCENARIO VERSION
<b>EXPANSION OPTIONS</b>
Scenario #1 - Full Mining of Site and Northern Expansion
Scenario #2 - Full Mining of Site and Vertical Expansion (Preferred)
Scenario #3 - Half Mining of Site and Vertical Expansion
Scenario #4 - Lined Northern Expansion only
<b>EXPORT OPTIONS</b>
Scenario #1 - Full Export with Similar Current Service Level at Depot
Scenario #2 - Full Export with Reduced Service Level at Depot

CURRENT LANDFILL, COLLECTION & RECYCLING BUDGET (2012)	
Garbage Collection	\$ 305,970.00
Landfill	\$ 502,233.00
Waste Diversion	\$ 390,057.00
Revenue - Waste Diversion Ontario	-\$ 88,580.00
Total Current Budget	\$1,109,680.00

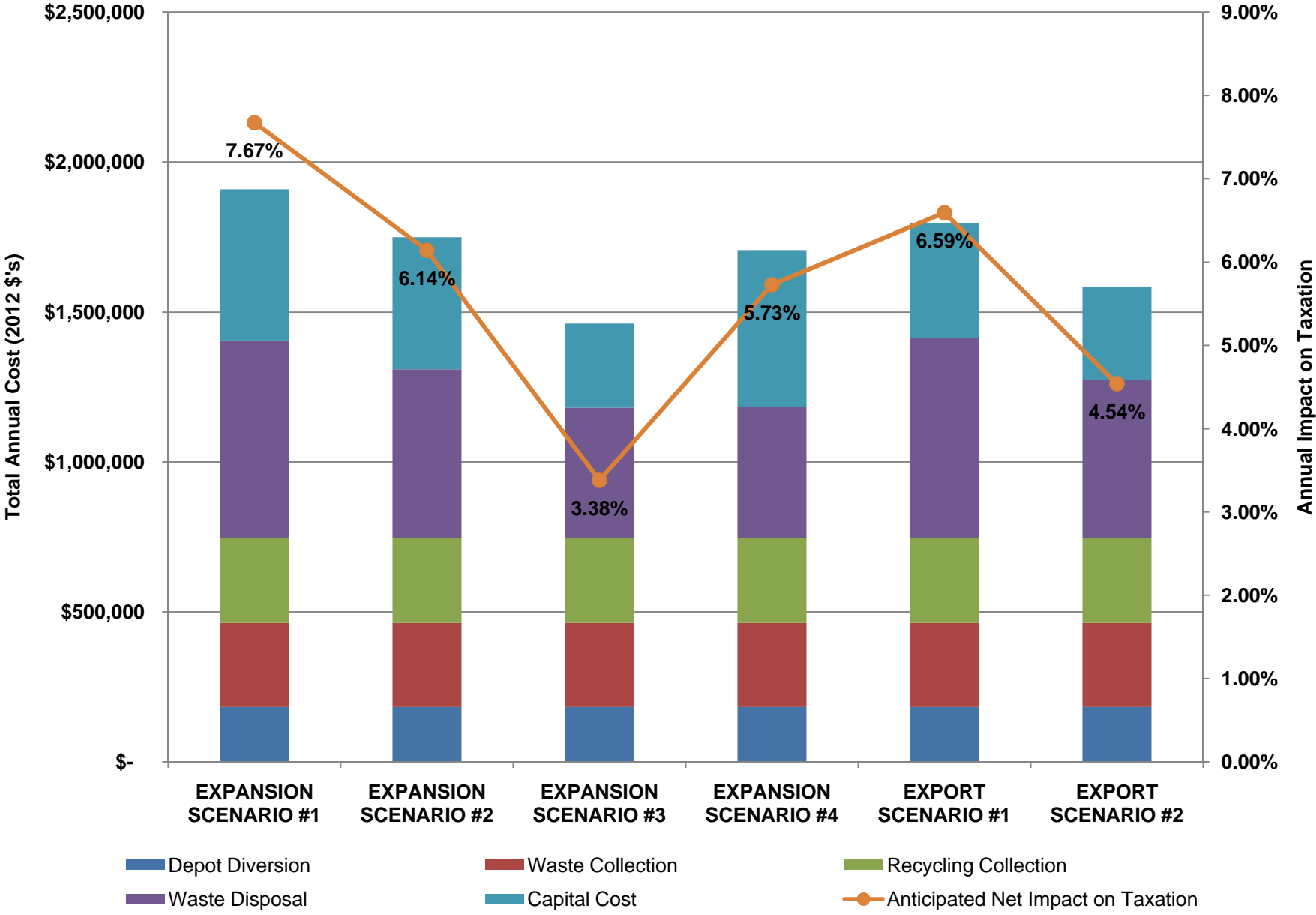
ESTIMATED ANNUAL VOLUMES	EXPANSION SCENARIO #1	EXPANSION SCENARIO #2	EXPANSION SCENARIO #3	EXPANSION SCENARIO #4	EXPORT SCENARIO #1	EXPORT SCENARIO #2
Estimated Landfill Lifecycle	40 Years	40 Years	32 Years	13 Years	0 Years	0 Years
Residential Curbside Collection (tonnes/year)	1,507	1,507	1,507	1,507	1,507	1,507
Multi-Residential Collection (tonnes/year)	431	431	431	431	431	431
Town Disposal at Depot (tonnes/year)	448	448	448	448	448	448
Residential Disposal at Depot (tonnes/year)	755	755	755	755	755	755
<b>Total Annual Waste Tonnages Landfilled</b>	<b>3,141</b>	<b>3,141</b>	<b>3,141</b>	<b>3,141</b>	<b>3,141</b>	<b>3,141</b>
Est. Total Annual Waste Volume (@ comaction of 700kg/m <sup>3</sup> )	4,500	4,500	4,500	4,500	4,500	4,500
Diversion Waste - Lumber and other Wood products	70	70	70	70	70	70
<b>Total Annual Waste Diverted &amp; Landfilled</b>	<b>3,211</b>	<b>3,211</b>	<b>3,211</b>	<b>3,211</b>	<b>3,211</b>	<b>3,211</b>

ANNUAL VARIABLE COSTS	EXPANSION SCENARIO #1	EXPANSION SCENARIO #2	EXPANSION SCENARIO #3	EXPANSION SCENARIO #4	EXPORT SCENARIO #1	EXPORT SCENARIO #2
<b>Depot Diversion (Wood Waste)</b>						
Depot Operational Costs	\$ 9,149	\$ 9,149	\$ 9,149	\$ 9,149	\$ 9,149	\$ 9,149
<b>Waste Disposal</b>						
Annual Landfilling Operational Costs	\$ 339,014	\$ 339,014	\$ 339,014	\$ 339,014	\$ 225,785	\$ 84,382
Annual Export Transportation & Tipping Fees	\$ -	\$ -	\$ -	\$ -	\$ 442,241	\$ 442,241
Leachate Treatment - Craigeith WWTP Capital Charge	\$ 5,164	\$ 3,627	\$ 1,921	\$ 4,729	\$ -	\$ -
Annual Leachate Treatment - Operating	\$ 315,500	\$ 220,850	\$ 94,650	\$ 94,650	\$ -	\$ -
Annual Leachate Treatment - Post Closure	\$ 141,975	\$ 99,383	\$ 53,241	\$ 131,054	\$ -	\$ -
<b>Total Waste Disposal Costs</b>	<b>\$ 659,678</b>	<b>\$ 563,491</b>	<b>\$ 435,585</b>	<b>\$ 438,393</b>	<b>\$ 668,026</b>	<b>\$ 526,623</b>
<b>Capital Cost</b>						
Landfill Expansion & Mining Annual Debt Repayment	\$ 475,500	\$ 412,170	\$ 215,960	\$ 128,700	\$ -	\$ -
Transfer Station Upgrades & Trailer	\$ -	\$ -	\$ -	\$ -	\$ 72,386	\$ -
Post Closure Capital - Capping Costs	\$ 28,140	\$ 28,140	\$ 35,175	\$ 88,660	\$ 56,280	\$ 56,280
Post Closure Monitoring	\$ -	\$ -	\$ -	\$ -	\$ 26,200	\$ 26,200
Remedial Costs	\$ -	\$ -	\$ 29,270	\$ 305,110	\$ 227,840	\$ 227,840
<b>Total Capital Costs</b>	<b>\$ 503,640</b>	<b>\$ 440,310</b>	<b>\$ 280,405</b>	<b>\$ 522,470</b>	<b>\$ 382,706</b>	<b>\$ 310,320</b>
<b>TOTAL VARIABLE COSTS</b>	<b>\$ 1,172,467</b>	<b>\$ 1,012,950</b>	<b>\$ 725,139</b>	<b>\$ 970,012</b>	<b>\$ 1,059,881</b>	<b>\$ 846,092</b>
Tonnes	3,211	3,211	3,211	3,211	3,211	3,211
<b>Net Cost (\$/tonne)</b>	<b>\$ 365</b>	<b>\$ 315</b>	<b>\$ 226</b>	<b>\$ 302</b>	<b>\$ 330</b>	<b>\$ 263</b>

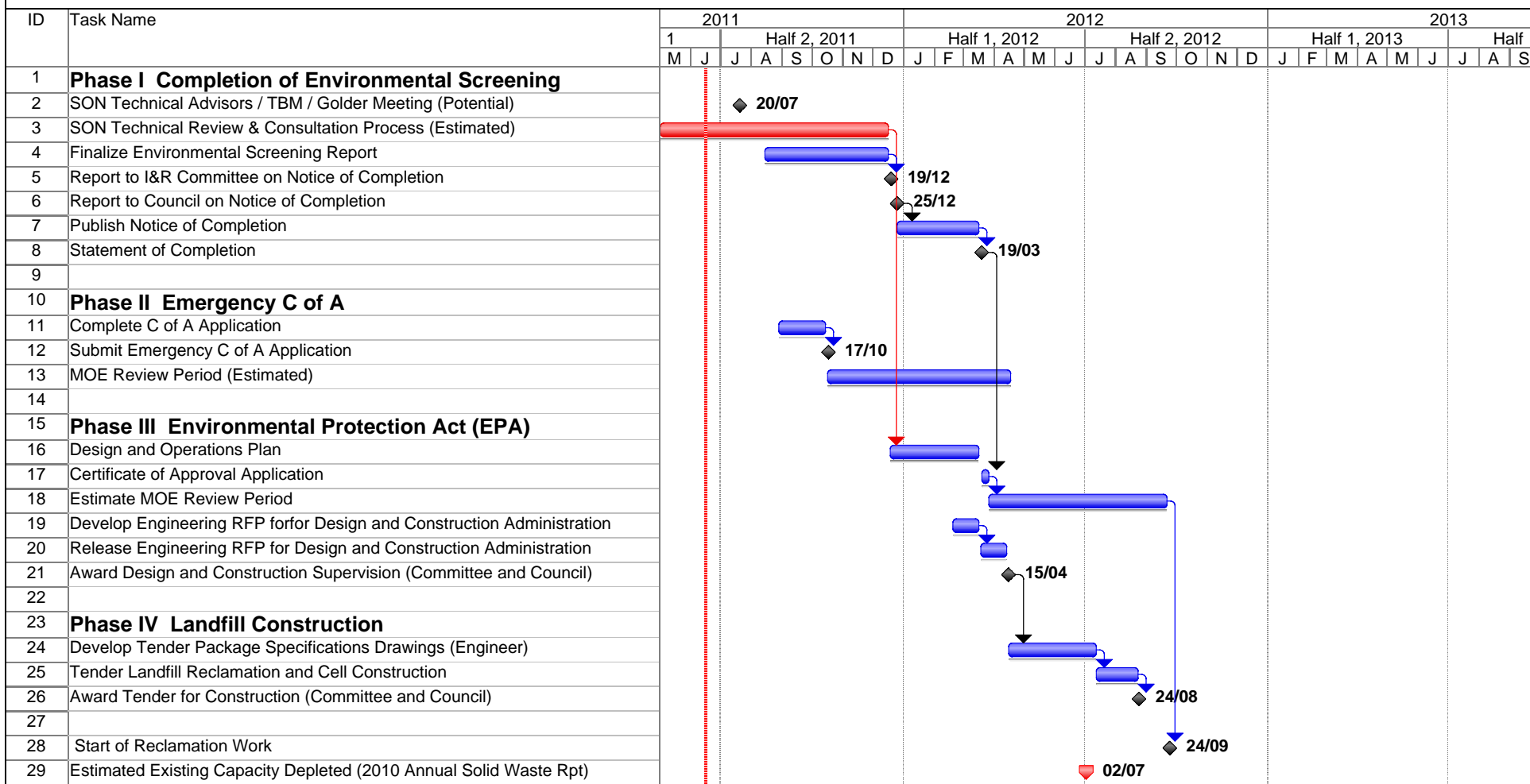
ANNUAL FIXED COSTS	EXPANSION SCENARIO #1	EXPANSION SCENARIO #2	EXPANSION SCENARIO #3	EXPANSION SCENARIO #4	EXPORT SCENARIO #1	EXPORT SCENARIO #2
<b>Depot Diversion (Orange Drop, WEEE, Composting, Metals, etc)</b>						
Depot Operational Costs	\$ 173,834	\$ 173,834	\$ 173,834	\$ 173,834	\$ 173,834	\$ 173,834
<b>Waste Collection at Curbside and Multi-Residential</b>						
Residential Curbside Collection	\$ 235,606	\$ 235,606	\$ 235,606	\$ 235,606	\$ 235,606	\$ 235,606
Multi-Residential Collection	\$ 44,863	\$ 44,863	\$ 44,863	\$ 44,863	\$ 44,863	\$ 44,863
<b>Total Operational Costs</b>	<b>\$ 280,469</b>	<b>\$ 280,469</b>	<b>\$ 280,469</b>	<b>\$ 280,469</b>	<b>\$ 280,469</b>	<b>\$ 280,469</b>
<b>Recycling Collection (curbside/multi-res)</b>						
Curbside & Multi-Res. Collection Contract	\$ 285,146	\$ 285,146	\$ 285,146	\$ 285,146	\$ 285,146	\$ 285,146
Staff Salaries, Advertising, Supplies, Wastewater Publication, etc	\$ 85,800	\$ 85,800	\$ 85,800	\$ 85,800	\$ 85,800	\$ 85,800
<b>Revenue - Waste Diversion Ontario Funding</b>	<b>-\$ 88,580</b>	<b>-\$ 88,580</b>	<b>-\$ 88,580</b>	<b>-\$ 88,580</b>	<b>-\$ 88,580</b>	<b>-\$ 88,580</b>
<b>Total Recycling Collection Costs</b>	<b>\$ 282,366</b>	<b>\$ 282,366</b>	<b>\$ 282,366</b>	<b>\$ 282,366</b>	<b>\$ 282,366</b>	<b>\$ 282,366</b>
<b>TOTAL FIXED COSTS</b>	<b>\$ 736,669</b>	<b>\$ 736,669</b>	<b>\$ 736,669</b>	<b>\$ 736,669</b>	<b>\$ 736,669</b>	<b>\$ 736,669</b>

ANNUAL LANDFILL, COLLECTION & RECYCLING COSTS	EXPANSION SCENARIO #1	EXPANSION SCENARIO #2	EXPANSION SCENARIO #3	EXPANSION SCENARIO #4	EXPORT SCENARIO #1	EXPORT SCENARIO #2
<b>TOTAL FIXED &amp; VARIABLE COSTS</b>	<b>\$ 1,909,136</b>	<b>\$ 1,749,619</b>	<b>\$ 1,461,808</b>	<b>\$ 1,706,681</b>	<b>\$ 1,796,550</b>	<b>\$ 1,582,761</b>
<b>CHANGE IN ANNUAL REQUIREMENT (from 2012 budget)</b>	<b>\$ 799,456</b>	<b>\$ 639,939</b>	<b>\$ 352,128</b>	<b>\$ 597,001</b>	<b>\$ 686,870</b>	<b>\$ 473,081</b>
<b>ANTICIPATED NET IMPACT ON TAXATION</b>	<b>7.67%</b>	<b>6.14%</b>	<b>3.38%</b>	<b>5.73%</b>	<b>6.59%</b>	<b>4.54%</b>

### Landfill Expansion & Waste Management Options



The Blue Mountains Landfill Project 2010 - 2012



Project: Landfill Project 2010-2012  
Date: Thu 16/06/11

Task		Milestone	◆	External Tasks	
Split		Summary		External Milestone	◆
Progress		Project Summary		Deadline	↓