



To: General Purposes Committee
From: Greg Scott, P. Eng., LEED A.P.
Director, Project Development

Date: May 31, 2010
File: 06-2050-20-HCC/Vol 01

Re: Hamilton Community Centre – Green Roof Access and Horticulture Options

Staff Recommendation

That the report entitled "Hamilton community Centre – Green Roof Access and Horticulture" from the Director, Project Development be received for information.

[Signature]
Greg Scott, P. Eng., LEED A.P.
Director, Project Development
(604-276-4372)
Att. 1

FOR ORIGINATING DEPARTMENT USE ONLY
ROUTED TO: Sustainibility, Parks Maintenance & Operations
CONCURRENCE: YES [checked] NO []
CONCURRENCE OF GENERAL MANAGER: [Signature]
REVIEWED BY TAG: YES [checked] NO []
REVIEWED BY CAO DEPUTY: YES [checked] NO []

Staff Report

Origin

On May 25, 2010 City Council passed the following resolution as it pertains to the construction of the Hamilton Community Centre Green Roof:

That:

- (1) staff be directed to investigate the possibility of green uses for the roof and report back.

Background

Green Roofs Use Options

The location of the green roof is key to determining the type and success of a green roof. Climatic conditions on a rooftop are often difficult. Wind, rainfall, building height and shade are all factors in determining what plants can be grown and the suitability of the space for public use. In general, there are three main types of green roofs, Extensive, Intensive and Semi-Intensive. The types largely differentiated based on their amount of growing medium, which in turn affects their costs and uses.

Extensive green roofs are generally not accessible and characterized by low weight, low capital costs, low plant diversity, and minimal maintenance requirements. Intensive green roofs are generally accessible and characterized by deeper soil and greater weight, higher capital costs, increased plant diversity, public amenity infrastructure (walkways, railings, lighting) and higher maintenance costs. Both types of roofs provide a range of socio-ecological benefits such as stormwater management, energy efficiency, habitat and roof infrastructure protection. In addition, intensive roofs can be used for public amenity space and include rooftop gardens.

Analysis

The current design of the green roof proposed at Hamilton Community Centre is an extensive type green roof where 100% of the new roof is to be covered with a light weight mat that has a sufficient growing medium and water retention for plant material such as sedums. The roof is also being used to harness solar energy to be used to heat the water in the building.

The extensive type of green roof was originally selected due to the poor soils in Hamilton area for building. The nature of the soils mean that costs increase significantly to install the necessary structural foundation to support a intensive green roof garden. In addition, the roof expansion provides relatively limited growing opportunities due to the size available which is restricted by building shading and solar energy equipment.

City staff and the project team reviewed the options to achieve the goal of allowing occupants of the community centre gain access to the roof and possible garden on the roof top space. The current design enables access to the roof for maintenance purposes via a ladder and access hatch.

General public access could be accommodated by one stairwell for egress and access as required by the Building Code if the occupancy of the roof was limited to 60 people. As this is a public assembly building an elevator must be added to make this area fully accessible. In addition, according to school and daycare regulators, two access pathways would need to be established for use by the school and/or daycare. It is staff's assessment that an external stairwell would need to be enclosed to ensure adequate levels of community safety and prevention of undesirable activities. The installation of an enclosed external stairwell is not recommended due to its high cost. An internal stairwell could be installed using the entire storage space between the preschool room and the multipurpose room.

To create a workable garden, the depth of soil would need to be doubled. The extent of the workable garden would be limited to 177 m² (1900 ft²), as some of the roof is occupied by solar hot water heating tubes, mechanical equipment, or is in shade from the upper sloped roof (see Appendix B). With the increase in the depth of the soil and the poor soils that exist in the Hamilton area, the complete design of the foundation and structure of the addition would have to change which would impact project time line and possibly our grant.

A cost estimate of the changes needed to provide access via one interior stairwell and convert a portion of the roof for horticultural purposes is provided below.

1. Guardrails \$20,000
2. Top of Stair Enclosure (BCBC requirement) \$8,000
3. Increase of Soil and creation of walk ways \$10,000
4. Structural Upgrade (more piles, columns, concrete base slab, roof structure) \$155,000
5. Elevator estimated at over \$125,000

Estimated total cost \$318,000

The estimated cost of \$170.00/ sq ft is significantly higher than many intensive roof gardens which generally range in the order to \$25.00 – \$50.00/ sq ft.

Other Opportunities for Rooftop Garden and Community Gardens

Staff continue to review all facilities, new and old, to identify sustainable opportunities. One example is the Library Cultural Centre's concrete patio roof top and the program to convert it to a green workable garden. The funding is in place to make this location a great demonstration green workable garden and staff are proceeding with design and implementation. It is estimated that the roof top garden can be installed for less than \$120,000. Another potential for a working garden is the installation of a community garden on the site grounds; this alternative to a roof top garden would require minimal infrastructure upgrades and could be accomplished by the collaborative work of staff and volunteers. The cost of the garden installation would depend on the plot design, irrigation upgrades necessary and number of plots built. It is estimated that the price would range from approximately \$500-\$2000 per a standard size (3 metre by 6 metre) plot.

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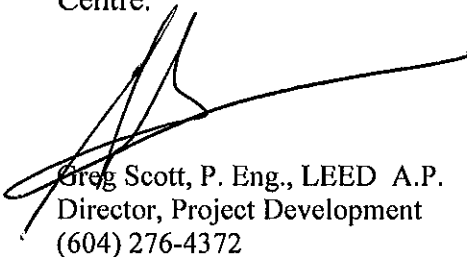
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Financial Impact

None

Conclusion

Due to the poor soil conditions of the Hamilton area, which increases the cost to install a workable green garden on the roof of the addition of the Community Centre, staff recommend that the City proceed with installing the light weight sedum green roof. Staff will also continue to design and construct a workable green garden on the lower roof of the Library Community Centre.



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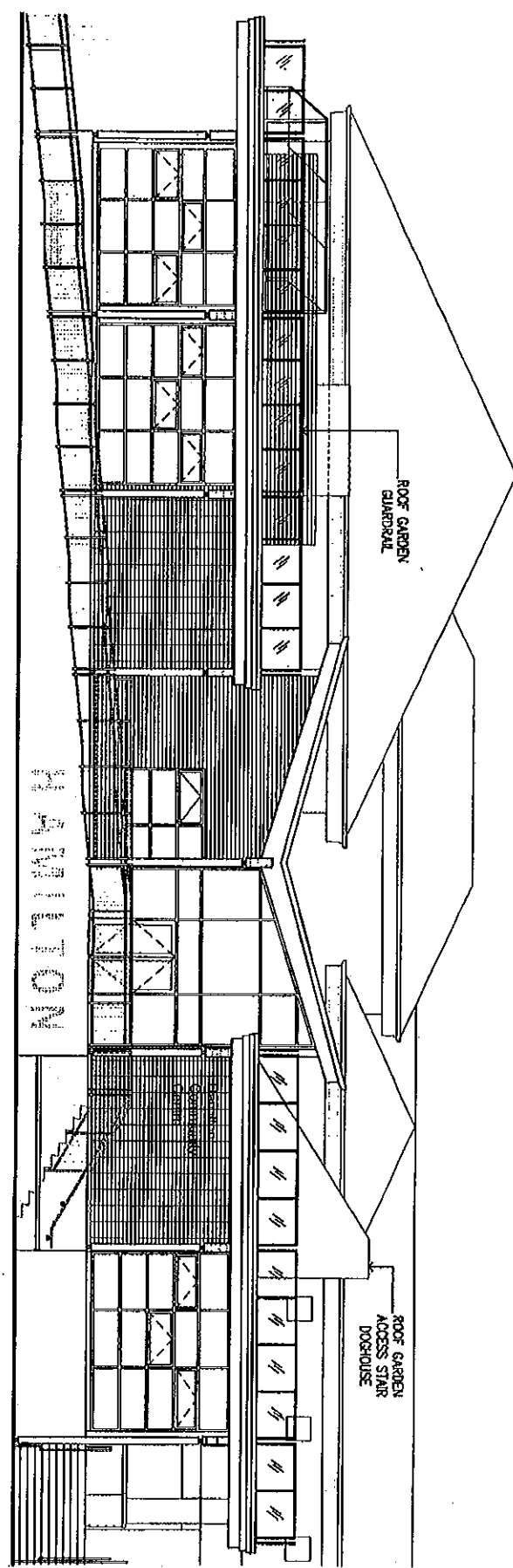
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APPENDIX A

1 NORTH ELEVATION
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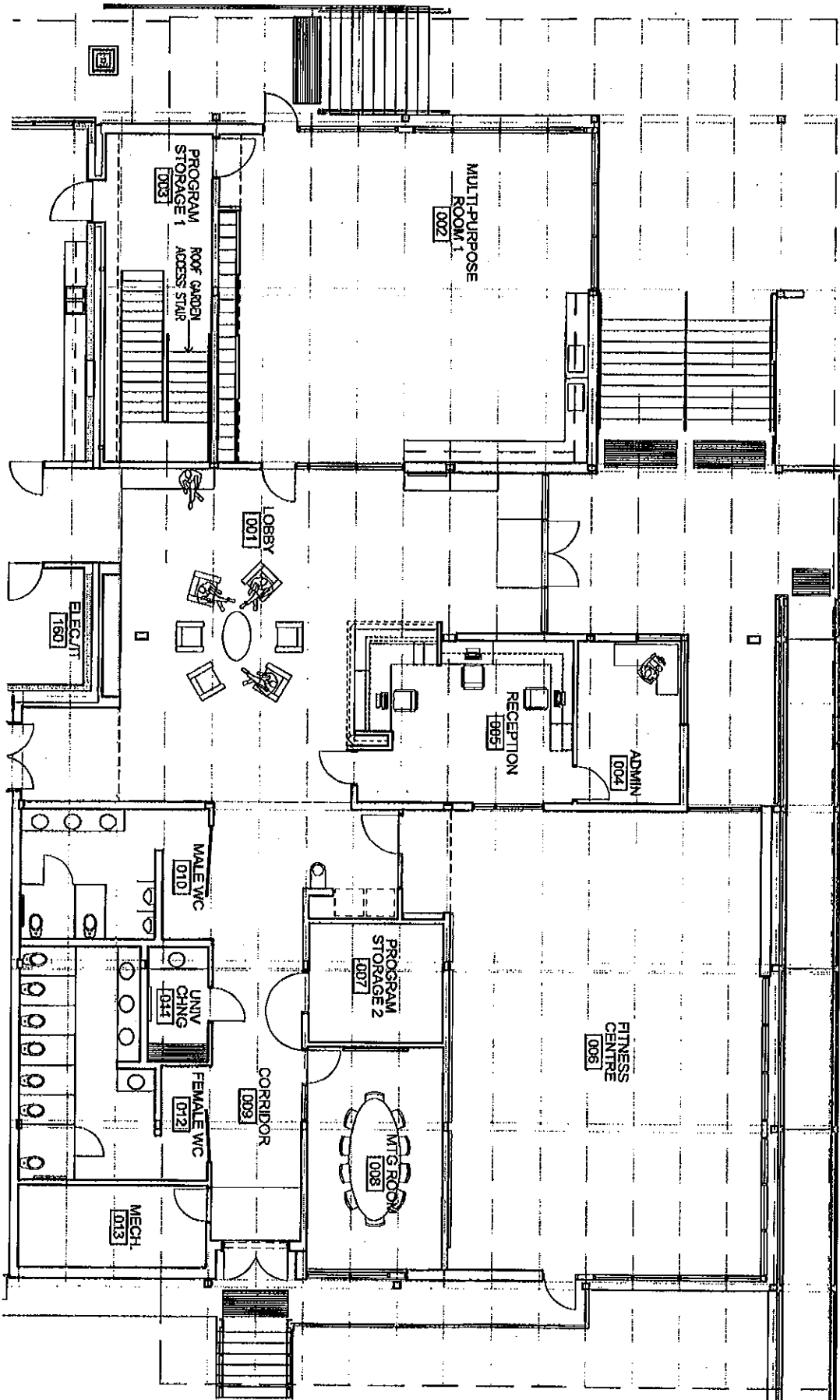
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EXPANSION PROJECT

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1 PLAN
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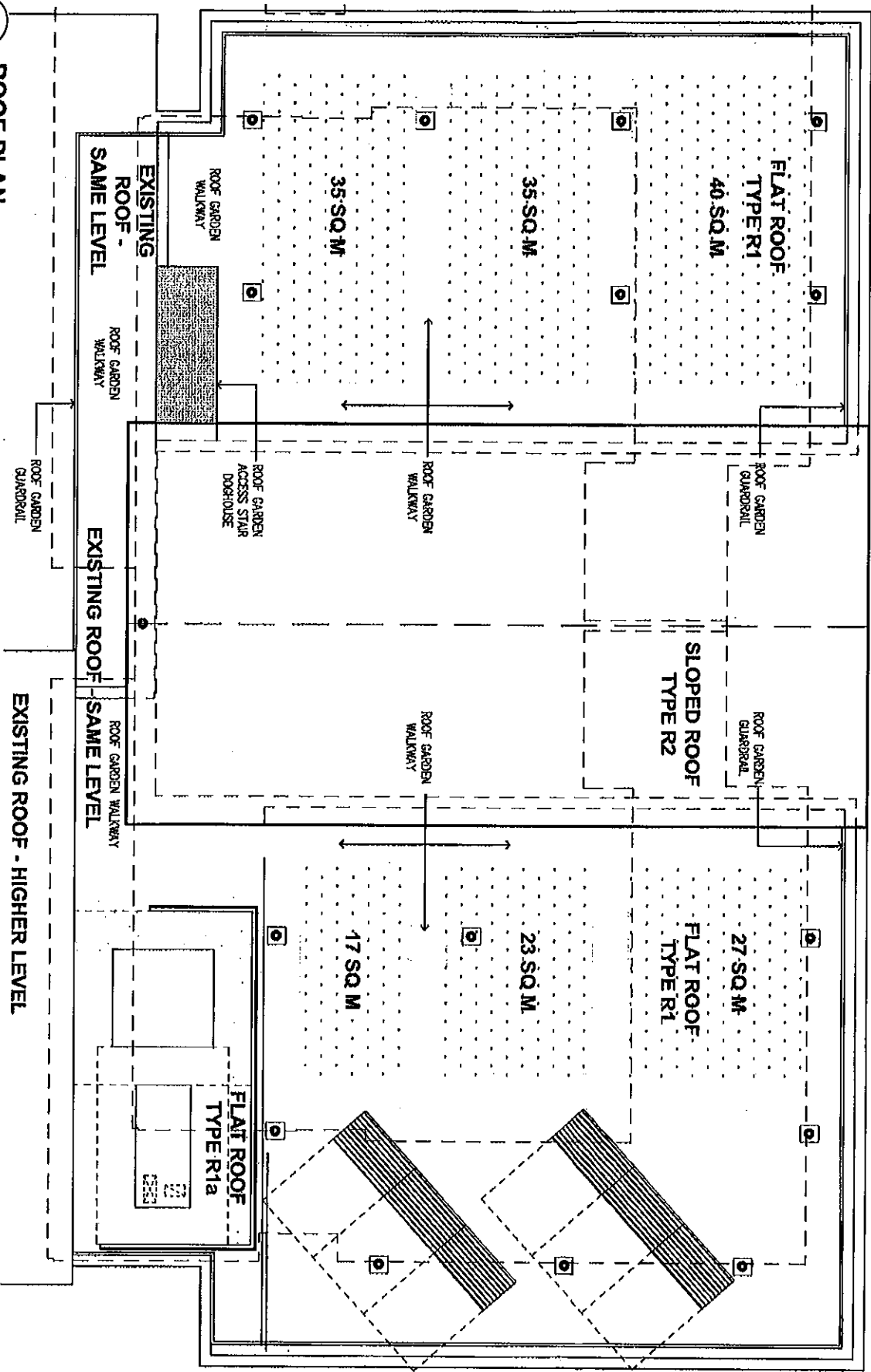
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ROOF PLAN



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