

University of Lethbridge

University of Lethbridge Quadrangle Conceptual Design Report

Prepared by:

AECOM

514 Stafford Drive North
Lethbridge, AB, Canada T1H 2B2
www.aecom.com

403 329 4822 tel
403 329 1678 fax

Project Number:

8023-006-00

Date:

June 2010

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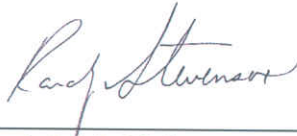
This Statement of Qualifications and Limitations is attached to and forms part of the Report.

Revision Log

Revision #	Revised By	Date	Issue / Revision Description
1	n/a	December 14, 2009	Draft 1
2	n/a	June 2010	Final

AECOM Signatures

Report Prepared By: for



Bernie Amell, CSLA
Environmental Designer

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1. Introduction

Late in 2008 AECOM was commissioned by the University of Lethbridge to prepare a comprehensive stormwater management strategy for the central/north area of the campus, including the planned Quadrangle area (the “Quad”) immediately north of Markin Hall. The first part of this commission focused on stormwater management, and was completed in November 2009. The Stormwater Management Plan establishes some specific targets for stormwater management in the Quad. As a minimum, the Quad landscape will be designed to capture and use the stormwater during a 1:5 year 3 hr duration storm event from the Quad area, as well as adjacent building roofs and paved areas. All of the concept plans under consideration can also manage larger events up to 1:100 year events.

The second part of the AECOM commission is the subject of this report: The Master Plan for the Quad.

One of the primary objectives of the Quad concept design is to reflect University policy for new buildings on the campus in advancing sustainable development leadership. As such, the Quad has been designed based on LEED principles. Specifically, there is a focus on various methods of environmentally benign water management techniques and on landscape design that responds strongly to local climate and microclimate realities. One term for this approach to landscape design is “Conservation Landscaping”.

2. Principles of Conservation Landscaping

(Adapted from SEVEN PRINCIPLES OF WATER-WISE LANDSCAPING - Utah Botanical Centre website)

2.1 Planning and Design

Develop a plan that effectively integrates environmental values, water management, aesthetics, desired uses and operational considerations. Important elements to consider include:

- Site Analysis – Soils, climate, microclimate, topography, drainage, existing vegetation, water balance objectives, views, utilities
- Landscape Goals and Objectives - Desired recreational activities, recycling and reuse objectives, maintenance, desired time to substantial completion of plan, landscape style.

2.2 Soil Analysis

Determine soil texture class (clay, silt, loam or sand) and whether there are distinctions among the soil horizons. Is there any sign of alkalinity or of high water tables? Determine natural soil water-holding capacity and prescribe soil or subgrade enhancements. Soil analysis may substantially affect irrigation scheduling and plant selection. Consider long-term root health and the provision of extensive root zones for larger plants. Promote deep rooting in all areas except wetlands.

2.3 Appropriate Plant Selection and Hydrozoning

Use only plant species that are well adapted to site conditions, and zone the landscape by grouping plants together according to their water requirements. Consider the long term interaction among the plants (associations) and between the plant association and the soil. Can a combination and pattern of plants, soils and water cycles be created that is nearly self-sustaining? How will the microclimate effects of surrounding buildings (existing and proposed) affect hydrozoning and plant selection?

2.4 Practical Turf Areas

Plant turf in areas of manageable sizes and shapes. Limit high maintenance turf to areas where it provides a functional benefit. Select appropriate turf varieties for the site. Consider varieties of grass seeding responding to differing hydrozones.

2.5 Efficient Irrigation

Irrigate efficiently – not excessively. Use properly designed systems and apply the right amount of water at the right time. Irrigate turf areas separately from other plantings. Do not rely solely on an automatic irrigation timer. Water efficiently and only when needed.

2.6 Mulching and Subsurface Features affecting Evapotranspiration

Use mulches in tree, shrub and perennial borders to conserve soil moisture, and manage weed growth and erosion. Consider granular beds, modified soils and other subsurface features to enhance moisture penetration and rooting depth.

2.7 Appropriate Maintenance and Monitoring

Conservation landscaping will reduce maintenance, not eliminate it. Low water-use landscapes are simply maintained differently than the typical manicured landscape. Monitor the effectiveness of water management features. Establish and maintain an Integrated Pest Management Plan (IPM).

3. Site Opportunities and Constraints

3.1 Frame

The Quad is bounded by Markin Hall (south), Anderson Hall (west), an unnamed future building (north), and a north/south campus road (east). The campus master plan indicates a future replacement or reconstruction of Anderson Hall, however, the timeline for this is uncertain, thus the steering committee directed AECOM to base the concept plans on the current building. Similarly, a proposed building across the road to the east of the Quad has an uncertain timeline. For the purpose of the concept design of the Quad, the east frame was assumed to remain as the existing tree grove. The design of the north building has not been defined so the Quad concept design indicates a footprint based on the Campus Master Plan, with a central pedestrian access facing the Quad (similar to the design of Markin Hall). For the short term this will likely remain as a simple grassed area.

The north and south architectural enframement is high enough, relative to the scale of the space, to negatively affect the visual experience within the Quad. A strongly defined edge of tall trees is recommended to moderate the apparent scale of these buildings. The lower mass of Anderson Hall allows smaller trees to be effective in softening the west edge of the Quad. The uniformity of the Anderson Hall facade will be counteracted by the visual diversity of the proposed tree and shrub plantings in all of the concept plans.

3.2 Wind

The dominant wind direction in the Lethbridge area (from the west to southwest) will strongly affect the Quad. Part of the Quad is shielded from pedestrian level winds by the mass of the Anderson Building; however, this wind barrier also produces wind acceleration zones that occur along the pedestrian way leading to Turcotte Hall. Wind issues in this part of the campus have been addressed in a report by [Rowan, Williams, Davies & Irwin Inc.](#), May 2009. The concept plan is based on the recommendations of this report. We note, however, that wind pattern modelling is a subtle “art” and we recommend that wind modelling be performed during the design stage of any new significant changes in building massing. The effect of the Anderson Hall building mass is to create a wind acceleration zone at the north end of the building that could lead to discomfort at the north end of the Quad. This wind acceleration zone will likely become more acute when the building along the north side of the Quad is built. Unfortunately this acceleration zone coincides with one of the most significant opportunity areas of the Quad - the north end solar microclimate area described in the following paragraph. All of the concept plans feature wind screening in the area northwest of the Quad to divert the accelerated wind further north toward the main east/west campus road where it may be beneficial in keeping the road clear of snow. The result is the creation of a wind protected zone coinciding with long solar exposure. This can become one of the most comfortable microclimates on the campus and of particular benefit during the late winter and late autumn.

Wind is also one of the defining characteristics of the Lethbridge landscape. Several of the concept plans indicate windmills or wind-activated sculptures as landmark elements.

3.3 Solar

Markin Hall creates a shaded zone along the south edge of the Quad. This area will be comfortable during the hottest weather; however, the majority of use of the campus is not during this period. Due to lower height, Anderson Hall creates a less significant shaded zone along the west side of the Quad. Shading along the east side is not significant due to the adjacent roadway. The net result is that there is a significant solar exposure area located in the centre/north/east side of the Quad. When the north building is constructed, this solar exposure can become reinforced by the reflected sun and heat from the building face. As noted previously, the potential benefit of this warm microclimate could be reinforced by wind control. The result would be one of the most comfortable places on the campus, particularly during the crucial late autumn and late winter periods when most other outdoor areas will

not support lingering use. All of the concept plans make use of this special microclimate, in particular lingering recreational uses associated with “The Lawn”.

3.4 Pedestrian Movement

Markin Hall and Anderson Hall set up clearly dominant points of access and lines of movement through the Quad. We assumed future similar access points and routes to the north and northwest of the Quad. Students tend to conform quite rigidly to these straight-arrow “desire lines”. All of the concept plans reflect the strength of these potential movement routes; however, Option 1 is almost directly derived from this pattern since it does not require any deviation from any straight line route. Other concept plans require slight deviation from some of the less dominant routes.

All of the concept plans also feature rectilinear N/S and E/W main paths located 4 to 8 metres away from existing or proposed building faces.

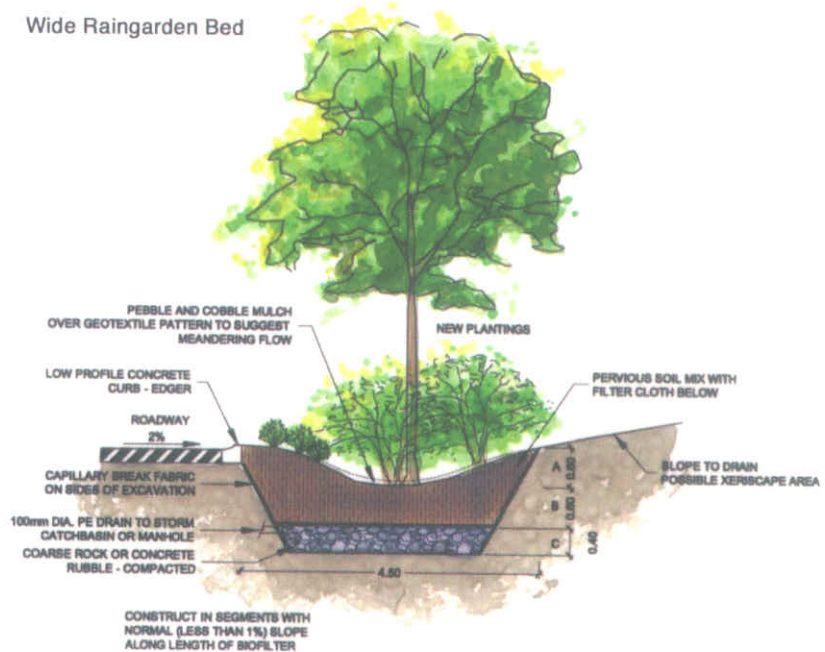
One of the associated features of main pedestrian routes is the creation of use nodes at the junctures of routes. These will be appropriate locations for seating and perching furniture and wayfinding elements. In each concept we have identified numerous seating nodes, as well as locations for sculptural or other landmark elements that will enhance memorable experiences of the most significant spatial junctures.

Each major pedestrian route can be conceived as a sequence of experiences that might include, for example, a place of anticipation, a place of entry, a safely enclosed segment, and a dramatic overview setting. All of the concept designs incorporate such spatial choreography in the interest of heightening the “sense of place”.

3.5 Water

All of the concept plans should provide a very high level of stormwater management for the Quad and adjacent roofs

and pavements as described in the first page of this report. The climate of Lethbridge is semi-arid and famously variable between seasons, and from year-to-year. One of the strongly desired uses of the Quad is as an informal turf recreation area to support students comfort and use. There is some inherent conflict between these design considerations. An entirely “xeriscaping” approach will not support some desired uses and/or aesthetic preferences for this important campus place. Realistically the provision of artificial irrigation will be required to turf areas that are intended to support desired use. Other grass and shrub/tree areas can be designed with little or no additional water beyond stormwater capture in the form of “rain garden beds”. Trees and shrub masses will be supported by deeper amended soil beds and gravel storage layers below the topsoil zone as illustrated in the figure.



3.6 Soils

The frequency and intensity of Chinooks, and other drying wind conditions in Lethbridge, is a major stress on tree and shrub plantings. One of the most effective means to counteract such stresses is to create deep planting beds and infrequent deep watering that combine to encourage deep rooting. This “rain garden” style of planting bed is proposed in all of the concept plans that have been developed for the Quad. The approximate area of such beds is 2160 sq m, and is illustrated in **Appendix 1**.

The existence of relatively impervious soil at intermediate depths is a local problem in many areas of Lethbridge. Water infiltration can lead to nearby slope instability or to excessive moisture in basement levels of buildings. This is relevant to the design of “rain gardens”, “bioswales” and similar features. Design should include underdrains in all such features to limit the depth and extent of saturation.

3.7 Views

North, south and west views out of the Quad space will be generally limited by building massing. This will set up tightly focused viewing experiences at the NW and SW corners, coinciding with the logical points of main pedestrian access. This kind of corner view/access pattern is termed a “windmill plaza” and is common in many old cities and campuses. Views to the east are limited by an existing tree mass across the service road. This may be replaced in whole or part by building massing as shown on the campus master plan. There is a focused view to the northeast – including a view of the famous Lethbridge rail trestle bridge. All of the concept plans enframe and enhance the view to this feature.

Views into the space will be tangential to each corner. Under such conditions, there is a risk that the presence of the Quad will be obscured by indirect lines of sight and by building massing. We advise some modification of nearby planting patterns and careful placement of landmark or wayfinding elements that will aid in orientation so that the relative location of the Quad, as seen from adjacent spaces, will be readily perceived and remembered. During winter and other inclement weather, much of the enjoyment of the Quad will be based on views from adjacent buildings. Thus, the design should have visual appeal in colour and texture when seen from these interior spaces. The concept designs include varying degrees of strong visual forms and textural diversity so that the space looks interesting from a distance of 50 to 100 metres throughout the year.

3.8 Crime Prevention through Environmental Design (C’PTED) and Lighting

There should be a clearly identifiable hierarchy of pedestrian routes with high visibility and lighting along the essential routes. This is particularly true of main meeting places. Some secondary non-essential routes could be unlit or less visually exposed. C’PTED objectives and wind sheltering can be somewhat divergent. This is particularly an issue in the wind gap at the NW of the Quad. Special attention to sightlines and lighting in this location will be required during the detailed design development.

3.9 Utilities

Future underground infrastructure is contemplated below and paralleling the main E/W and N/S pathways along the existing and proposed building facades. Utility alignments should avoid proposed rain garden and bioswale bed areas (extents of which are shown in **Appendix 1**). The specifics of utility alignments should be determined during the design development phase for the Quad landscape.

4. Alternative Concept Designs

AECOM originally prepared three sketch concept designs which were presented to the University of Lethbridge Project Steering Committee in early October 2009. Based on feedback received at a meeting with the committee, the three original concept designs have been refined and another “hybrid” concept plan has been prepared. It is intended that all four concept designs will be presented to the larger University community at an open house event to be held in January 2010.

All of the concept designs support the overarching stormwater and environmental design objectives described above. Distinctions among the concept designs are thus based on aesthetic and programming differences that do not compromise the environmental objectives of the University. Each concept plan reflects a specific landscape design theme:

1. Harvard Yard
2. Indigenous Art
3. Biodiversity
4. Hybrid

The intention of these alternatives is to inspire discussion leading to a clearer understanding of the best design to suit the collective University community. A “vote” on the alternative plans is not intended, and it is recognized that the preferred design for the space may be a variation of one of these concepts or may be a synthesis. The following descriptions focus on the distinctions among the concept plans without describing the points of commonality among them.

4.1 Harvard Yard

The main quadrangle of the Harvard Campus is considered to be an iconic space based on a simple geometry of rectilinear and diagonal desire line routes. The Harvard campus context is a near-level urban landscape while the Lethbridge campus features dramatic coulee landforms. Appropriately, the Harvard Yard features entirely level grass between the paths, while the Lethbridge Yard features vertical landforms expressed as geometric grassed berms and basins between the pathway routes, which will be essentially level.

The design of meeting places and furnishings should also reflect the geometric character of this scheme.

Many of the trees are arranged in Allees, that is, linear plantings sometimes touching above the pathway to create a linear enclosed canopy. Trees on the south side of such paths are always deciduous to reduce snow and ice accumulation on paths.

One element of this concept is the “Rail Trail” celebrating the importance of rail lines in Lethbridge. This feature is precast paving stones set level within a grassy area – inviting pedestrians to step from stone to stone recalling the experience of walking from tie to tie on a rail line.

4.2 Indigenous Art

Plains native art forms, particularly tee pee decorations, have provided the inspiration for the forms and colours in this concept plan. It is not appropriate that we copy or directly imitate such forms, so we have used them a general visual reference only.

The arrangement of landforms is organic but obviously artificial, like a line of midden berms adjacent to a long-favoured campsite. The berms will feature native bunch grasses on the slopes and crest, and shrub thicket clumps in adjacent low areas. There are several sculptural seating features that recall the gut and outline diagrams of wildlife. Entering the Quad from Markin Hall there is a circle of boulders resembling a tee pee ring.

The central meeting and lingering space (the Seating Pod) will have a particularly strong mythic/natural form.

4.3 Biodiversity

The special microclimate proposed to be created in this space will be warm, wind sheltered, with localized moist pockets, nearby dry areas and a full spectrum of soil and moisture conditions in separate patches. The result is a space in which virtually anything that can be grown in the Lethbridge region can thrive. This concept design is a botanical garden in a bottle, featuring biodiversity and a fascinating pattern of nature inspired forms and textures. Hopefully, the botanical diversity will eventually serve as a teaching function.

One or two small water features are included to support the botanical diversity of riparian and aquatic habitats. This degree of botanical diversity will also inevitably attract and sustain some wildlife, in particular songbirds.

A dry streambed and some exposed rock work will extend the biodiversity to include gravel bar and alpine habitats. During rainstorms or snow melt this channel will convey some water, otherwise it will be dry.

4.4 Hybrid

The steering committee requested AECOM to develop a hybrid concept that incorporates a variety of elements from the three thematic concepts. We acknowledge that the permutations of such a hybrid approach are infinite; this is merely one such design that blends divergent elements in a coherent way.

The major pedestrian routes are rectilinear and diagonal straight lines, similar to the Harvard Yard concept. One of the long diagonals, which is a relatively less used route, is a Rail Trail as described in the Harvard Yard concept.

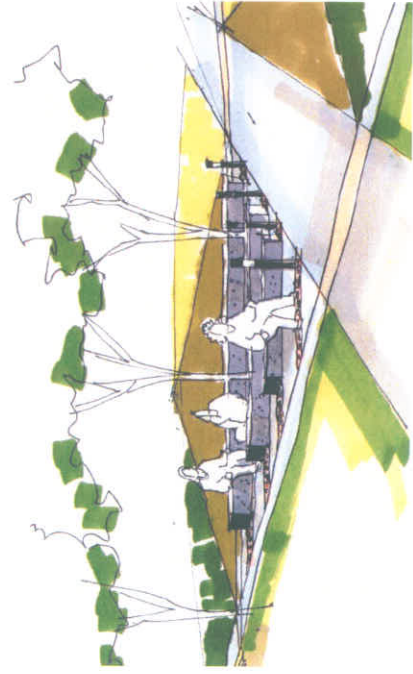
There is a series of low berms of organic shape along the south and west of main space. Where the main paths intersect with this berm, there will be "Geo Sculptures". These sculptures are conceived as soil cement, vertical banks representing the strata of the terrain in some Oldman River escarpments and coulee slopes in Lethbridge.

A windmill sculpture is located in the shelterbelt area northwest of the Quad. This will serve as a landmark visible from the main parking area and from the Quad.

Coming into the Quad from the northwest, pedestrians will cross a bridge spanning a pocket wetland. A metaphorical creek will lead from this point to the main seating pod located in the centre of the Quad.



SECTION - 1

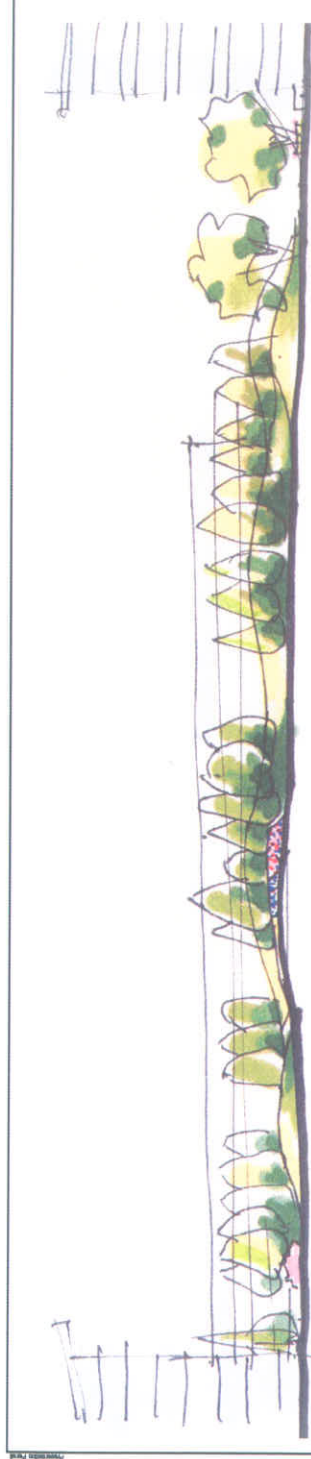


VIEW - 1



VIEW - 2

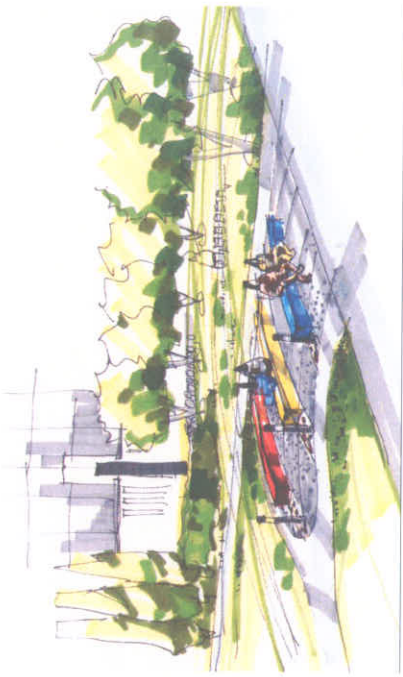




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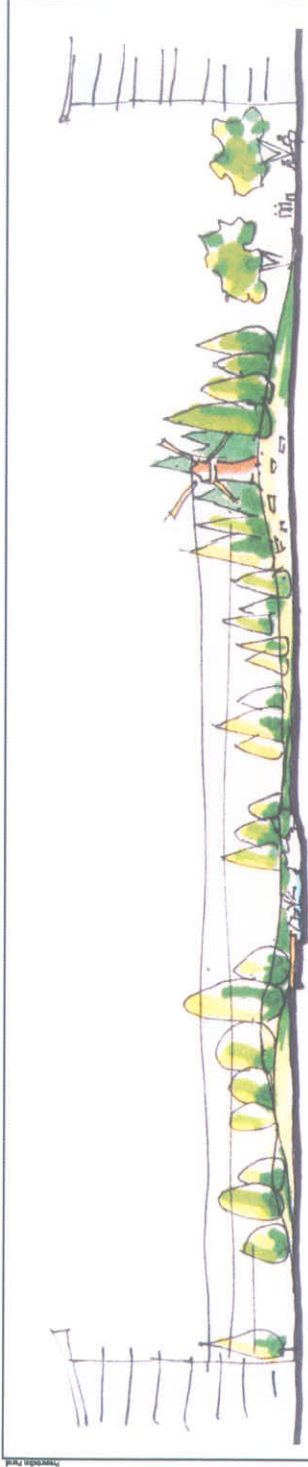


VIEW - 3



VIEW - 4





SECTION - 3

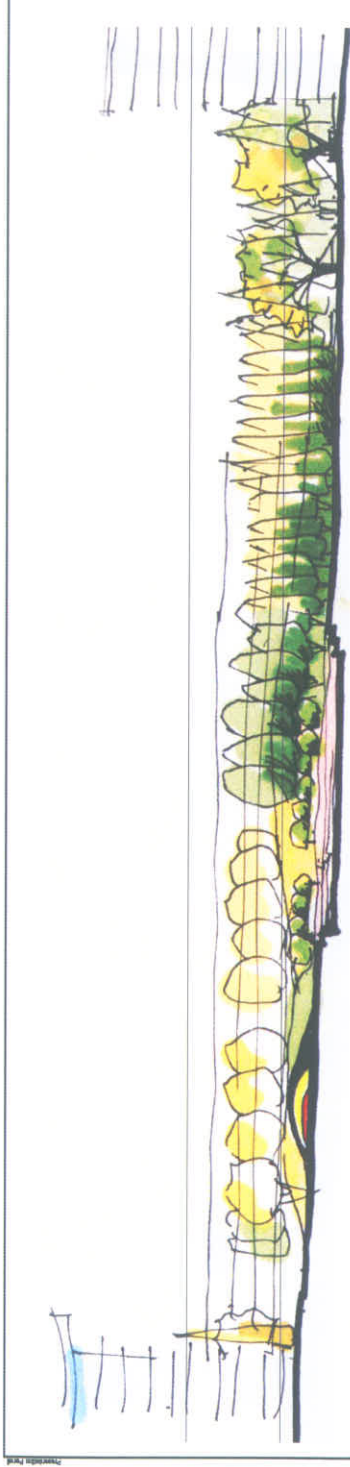


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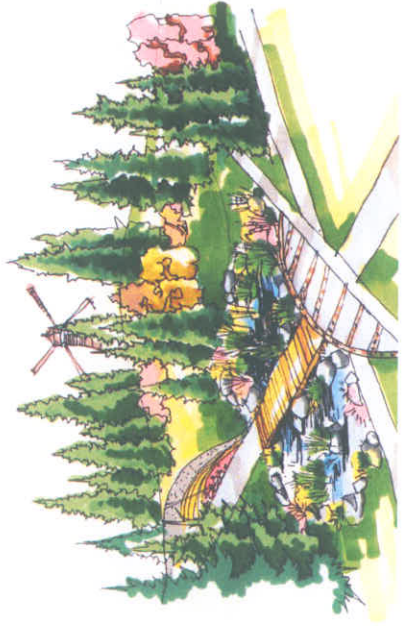


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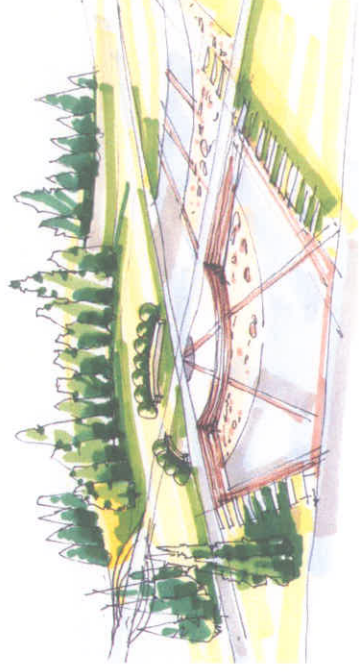




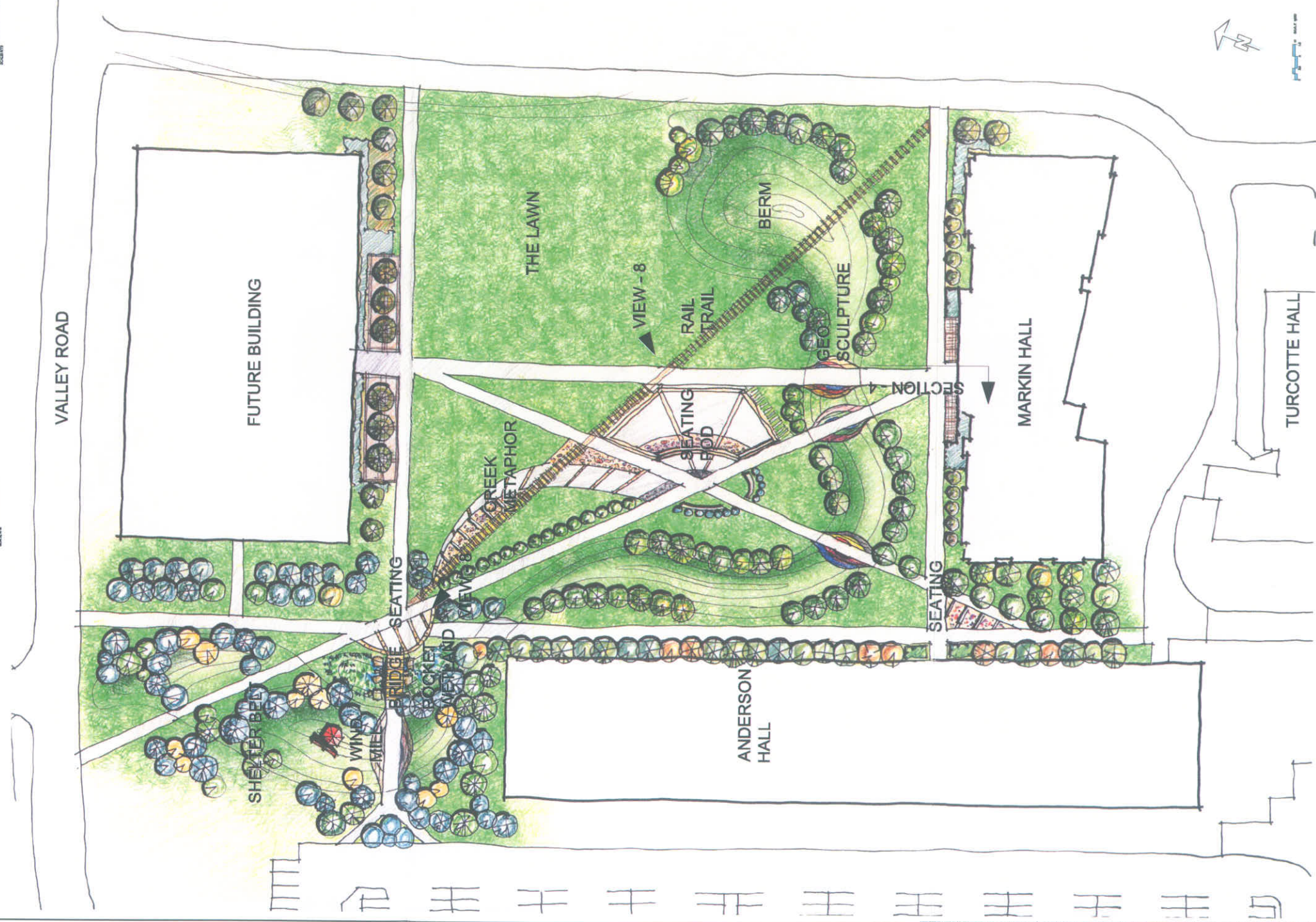
SECTION - 4



VIEW - 7



VIEW - 8



Appendix 1

Quadrangle Conceptual Design Report

- Sustainable Urban Drainage (SUD) Bed Plans

