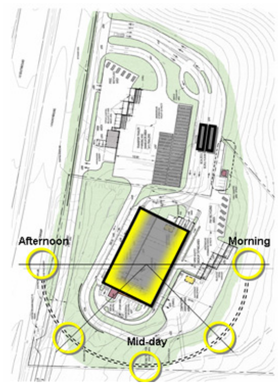
# Appendix B
# LEED™ Evaluation Materials

# Eco Charrette Results

Pre-Design Phase



## Bow Lake Transfer Station

King County Solid Waste Division

Prepared for:
King County Solid Waste Division
201 S. Jackson Street
Seattle WA 98101

King County

R W Beck
1001 Fourth Avenue, Suite 2500
Seattle WA 981541004
(206) 695-4700
www.rwbeck.com

Prepared by:
Paladino and Company, Inc.
110 Union Street, Suite 400
Seattle WA  98101
(206) 522-7600  Fax (206) 522-7666
www.paladinoandco.com

## How to interpret this report

This report compiles the ideas generated at the Eco Charrette. At the Eco Charrette and in this report, ideas are grouped by the six LEED categories, of Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, and Innovation and Design.

Credits were subdivided differently in the Eco Charrette than in this report. During the Eco Charrette ideas were organized using general sustainability topics for ease of understanding. This Eco Charrette Report assigns the ideas to specific LEED prerequisites and credits. While the report shows ideas under the credit that they support, not every idea needs to be completed to earn a credit. Conversely, an Eco Charrette idea that helps more than one credit appears in multiple credits.

| Possible | Potential | Unlikely |
|---|---|---|
| Y | ? | N |

Prerequisites must be achieved while credits can be pursued at the discretion of the design team. Some credits are more likely to be implemented than others. As shown to the left, credits that seem feasible are marked "Possible". More challenging credits are marked "Potential". Credits not likely to be pursued are marked "Unlikely".

An Eco Charrette Scorecard is also provided showing a preliminary evaluation of LEED performance. The Scorecard shows all prerequisites and credits, whether ideas were generated or not.

In addition, the Eco Charrette meeting featured break-out groups to discuss how ideas presented may translate into design concepts for the project. A summary of the two break-out groups (Site Group and Building/Systems Group) is located in the Appendix of this report.

In combination, the Eco Charrette Report, Scorecard and Appendix present a starting point for LEED certification. The next step for the design team is to discuss and evaluate these assumptions, integrating the most effective ideas into the design and development of the project.

Note: LEED$_{TM}$ is a registered trademark of the US Green Building Council.

## Project Description

The Bow Lake Transfer Station project is a redevelopment and expansion of the existing transfer station in Tukwila, WA. The project will include facilities for commercial hauling, commercial & Self-Haul waste disposal, recycling and potentially a Household Hazardous Waste (HHW) facility.

The purpose of the Eco Charette held on November 2, 2005 was to discuss environmental & economic goals of the project related to the development of the new transfer station site, building, program and maintenance procedures. Precedent for this project comes from the 1st Northeast Transfer station, which is a similar project under development that is pursuing LEED Silver certification. While this facility will be used as a model of comparison, the design team will adjust any strategies to be specific to the context of the new development.

## Next Steps

At the close of the Eco Charrette, the following action items were identified:

1. Program & Staffing Study: The program needs to be defined to determine if the facility will include a full recycling center, yard waste recycling, Household Hazardous Waste Facility in addition to waste. A determination by King County on the staff they are willing to commit to each of the proposed program elements will drive the layout of these on-site area.

2. Circulation Study: In order to determine the interrelation between staffing and program elements, a study needs to be performed that will address the circulation through the scales house, wait times, and single-use visitors and the effect on the layout of the program on-site.

3. Site Design Schedule: Staffing and program elements must be determined by King County in order for the design team to complete the final site layout.

4. Building Design: The building design will begin in the next phase of the project. Several studies were identified in the Charrette that will inform the design of the transfer station shell.
   A. Daylight Model Study
   B. Wind Airflow Pattern Study
   C. Skylight & Structural Integration Study
   D. Footing Reuse Study

Possible Potential Unlikely

## Sustainable Sites

Possible Points 14

The site opportunities discussed at the Eco Charrette were focused on circulation, storm water management and excavation. A customer flow study is required to determine how consumer and commercial haulers use the site, and how specific operations can be separated for more efficient circulation. This strategy has potential to reduce emissions and trips through the scale house that are needed for each customer visit. This will influence the final placement of buildings, roads and walkways.

Site excavation will focus on a balanced cut and fill, with the reduction of soil being trucked off-site. All soil that contains previous landfill material will be separated from clean soil and moved to a proper containment location.

Storm water management will primarily be handled through underground vaults, with rain collected from the transfer station roof being contained in a separate tank. Surface water management will limit infiltration due to the presence of landfill material. All storm water will be pre-treated to reduce the impact to city treatment facilities.

| Possible | Potential | Unlikely |
|---|---|---|
| Y | | |

### Erosion & Sedimentation Control

SS Prerequisite 1

- Use compost berms to mitigate construction disturbance
- .

| Possible | Potential | Unlikely |
|---|---|---|
| Y | | |

### Site Selection

SS Credit 1

- Protect site hydrology (specifically at the bottom of the hill)

| Possible | Potential | Unlikely |
|---|---|---|
| | ? | |

### Brownfield Redevelopment

SS Credit 3

- Reuse the existing site
- Mitigate the landifll material
  Barrier: Site not designated as contaminated

| Possible | Potential | Unlikely |
|---|---|---|
| | ? | |

### Alternative Transportation, Public Transportation Access

SS Credit 4.1

- Install an access road with planned connections to areas beyond the site
  Benefit: This could be an community asset

| Possible | Potential | Unlikely |
|---|---|---|
| Y | | |

### Alternative Transportation, Bicycle Storage & Changing Rooms

SS Credit 4.2

- Provide bicycle storage for the TSO building

| Possible | Potential | Unlikely |
|---|---|---|
| | ? | |

## Alternative Transportation, Alternative Fuel Refueling Stations

SS Credit 4.3

- Provide electric vehicles for on-site transportation
- Use vegetable-based hydraulic oil for the compactors
- Use biodiesel for 5% or more of vehicle fuel
- Use low-sulfur diesel for vehicles and equipment

| Possible | Potential | Unlikely |
|---|---|---|
| Y | | |

## Alternative Transportation, Parking Capacity

SS Credit 4.4

- Provide carpool spaces
- Optimize truck drives to reduce the number of trips and idling emissions
- Separate the circulation paths of consumer users and commercial haulers
  Benefit: This is the standard design
- Orient the building for efficient circulation
  Note: Requires a customer flow study

| Possible | Potential | Unlikely |
|---|---|---|
| | ? | |

## Reduced Site Disturbance, Protect or Restore Open Space

SS Credit 5.1

- Limit excavation and hauling
- Remove invasive species
- Minimize the disturbed footprint

| Possible | Potential | Unlikely |
|---|---|---|
| | | N |

## Reduced Site Disturbance, Development Footprint

SS Credit 5.2

- Use vegetation to restore disturbed areas of the site

| Possible | Potential | Unlikely |
|---|---|---|
| | | N |

## Stormwater Management, Rate and Quantity

SS Credit 6.1

- Use open space for stormwater dispersion
- Use pervious concrete combined with collection to reduce stormwater rate
  Benefit: This may reduce the size of the vaults
  Barrier: Quantity reduction is difficult due to landfilled soils
- Stormwater quality and quantity management
  Benefit: King County requires stormwater management
  Barrier: Quantity reduction is difficult due to landfilled soils
- Reuse on-site stormwater
  Barrier: No on-site infiltration permitted due to landfilled soil

| Possible | Potential | Unlikely |
|---|---|---|
| Y | | |

## Stormwater Management, Treatment

SS Credit 6.2

- Separate trailer parking runoff from stormwater system
- Covered area for loaded trailers
- Cover "white goods"
  Barrier: Difficult to dig down due to soil content
- Treat I-5 stormwater
  Benefit: May be negotiable with WA DOT
  Barrier: Very expensive
- Capture hill stormwater to prevent wetland contamination
- Biofiltration of water leeching through hill slope
  Barrier: Bottom of hill not within property
- Use storm filter to treat water
- Treat stormwater from local access road
  Benefit: Required by code
- Connect to the city sewer service
  Benefit: May reduce truck emissions from transporting off-site which will reduce costs

| Possible | Potential | Unlikely |
|---|---|---|
| | ? | |

## Landscape & Exterior Design to Reduce Heat Islands, Non-Roof Surfaces

SS Credit 7.1

- Minimize paved surfaces
- Use pervious pavers for parking and walkways
  Benefit: May be combined with stormwater collection system
  Barrier: On-site infiltration not permitted due to soil content
- Use light-colored, reflective concrete
- Use concrete for all heavy traffic areas

| Possible | Potential | Unlikely |
|---|---|---|
| Y | | |

## Landscape & Exterior Design to Reduce Heat Islands, Roof Surfaces

SS Credit 7.2

- Install green roofs on the scale house, other buildings on site
  Note: Coordinate with rainwater collection
- Use light-colored and reflective roofing

| Possible | Potential | Unlikely |
|---|---|---|
| Y | | |

## Light Pollution Reduction

SS Credit 8

- Reduce I-5 light pollution
- Reduce on-site light pollution with shielded fixtures and appropriate placement

Possible Potential Unlikely

## Water Efficiency

Possible Points 5

Water efficiency will be achieved through rainwater collection and source reduction. Rainwater will be collected from the transfer station roof and stored in either a below-ground tank or an above ground tank located inside the building. A possible location is above the compactor wall in line with the center of the building to reduce leader rise/runs. This stored water will be used primarily for operations maintenance, such as tipping floor wash-downs and vehicle cleaning. The rainwater may also be used for toilet flushing. At times in which there is no rainwater available, a potable water make-up line will maintain flows for the facility.

Low-flow fixtures will be investigated for use in TSO areas and other buildings to reduce overall water demand. Samples include, but are not limited to, waterless urinals, dual-flush toilets & valves, low-flow showers & low flow lavatories.

| Possible | Potential | Unlikely |
|---|---|---|
| Y | | |

### Water Efficient Landscaping, Reduce by 50%

WE Credit 1.1

- Low-maintenance landscaping
- No deciduous trees
- Use drought-tolerant landscaping
- Use native vegetation

| Possible | Potential | Unlikely |
|---|---|---|
| Y | | |

### Water Efficient Landscaping, No Potable Use or No Irrigation

WE Credit 1.2

- Do not install an irrigation system

| Possible | Potential | Unlikely |
|---|---|---|
| Y | | |

### Innovative Wastewater Technologies

WE Credit 2

- Separate roof drainage from stormwater
- Install waterless and low-flow fixtures
- Install composting toilets
  Barrier: Low employee acceptance
- Use rainwater to flush toilets

| Possible | Potential | Unlikely |
|---|---|---|
| Y | | |

## Water Use Reduction, 20% Reduction

WE Credit 3.1

- Use underground tank for storage of rain water
  - Benefit: SeaTac requires vault
  - Benefit: Underground tanks are less expensive
- Wash down floor, clean skylights with rain water
  - Benefit: Opportunity for operations savings
- Collect rainwater from the roof
  - Benefit: High-valued opportunity
  - Barrier: Can only collect from roof--no stormwater
- Install a water-efficient misting system
- Use high-pressure, low-flow hoses
  - Barrier: Volume and pressure needed for cleaning
  - Barrier: Low employee acceptance

| Possible | Potential | Unlikely |
|---|---|---|
| Y | | |

## Water Use Reduction, 30% Reduction

WE Credit 3.2

- See WE credit 3.1 for ideas

Possible Potential Unlikely

## Energy & Atmosphere

Possible Points 17

The building will be oriented to capture prevailing winds for cross-ventilation, in order to reduce the need for mechanical ventilation. The building geometry will contribute to comprehensive airflow throughout the tipping floor area while providing windbreaks at the user height. Fans will remain in the design to permit quick exhaust in emergency situations, but will have a different control sequence optimized to work in conjunction with the natural ventilation scheme to promote energy efficiency. The roof of the tipping floor will coordinate with natural ventilation and daylight design.

Daylighting will be provided by side and overhead translucent panels which will mitigate glare caused by direct solar penetration. The project team may utilize the free services of the Daylighting Design Lab to test physical models to help optimize the size, location and type of skylights proposed. The high bay lights located in the tipping floor will feature daylight sensors to dim the lights during times in which daylight is sufficient to meet lighting needs of a safe working environment.

All other buildings located on-site will explore the use of efficient lighting, efficient HVAC equipment and will feature operable windows to increase energy performance of the project. All buildings will need to be modeled using DOE 2 compatible energy simulation software in order to qualify for any EA credit 1 points.

| Y | | |

### Fundamental Building Systems Commissioning

EA Prerequisite 1

- The building will be commissioned

| Y | | |

### Minimum Energy Performance

EA Prerequisite 2

- Perform energy simulations to predict energy performance

| Y | | |

### CFC Reduction in HVAC&R Equipment

EA Prerequisite 3

- No CFCs in HVAC equipment

| Possible | Potential | Unlikely |
|---|---|---|
| Y | | |

## Optimize Energy Performance, 20% New / 10% Existing

EA Credit 1.1

- Create opportunities to take advantage of passive solar heating
- Use natural ventilation for tipping floor and other areas of the building
- Use a high efficiency envelope
- Design an earth berm or below-ground TSO area
  Barrier: Below-ground construction may impact daylight, views and IAQ
- Use EnergyStar appliances
- Site the transfer building for orientation to sun and wind
- Schedule off-peak power use for the 20-hr facility
  Benefit: Compactors can be run at night
- Install a ground-source heat pump
  Benefit: Opportunity for synergy with stormwater storage
  Note: Requires energy modeling to verify benefits

| Possible | Potential | Unlikely |
|---|---|---|
| | ? | |

## Renewable Energy, 5% Contribution

EA Credit 2.1

- Install a grid-tie PV system
  Barrier: Lack of incentive $$ from public sources
- Use appliance-based PV for small exterior applications
- Install solar thermal collectors for hot water and heating
- Generate hydroelectric power from stormwater runoff
  Barrier: Feasibility challenges

| Possible | Potential | Unlikely |
|---|---|---|
| Y | | |

## Additional Commissioning

EA Credit 3

- Engage in additional commissioning process

| Possible | Potential | Unlikely |
|---|---|---|
| Y | | |

## Ozone Depletion

EA Credit 4

- Use HFC Refrigerants

| Possible | Potential | Unlikely |
|---|---|---|
| Y | | |

## Measurement & Verification

EA Credit 5

- Install a permanent energy management system
- Track all energy use through metering systems

| Possible | Potential | Unlikely |
|---|---|---|
| | ? | |

## Green Power

EA Credit 6

- Purchase green power

Possible Potential Unlikely

## Materials & Resources

Possible Points 13

Key concepts discussed that apply to the Materials & Resources Category were the reuse and recycling of existing site materials. Site elements that could potentially be reused are the scale houses, scales, fuel tanks, steel structure for small sun/rain protection structures and the compactors. Materials such as the transfer station roofing and concrete pavement may be recycled on-site. The remainder will be handled through a Construction Waste Management program that is targeted to divert 75% or more of the waste from a landfill.

Recycled content and salvaged materials will be utilized throughout the facility that will seek to educate visitors, users and workers the potential for recycling. All finish materials located in the scales house, TSO area and HHW facility will highlight recycled content materials, such as recycled steel, gypsum, countertops, carpet and other finish materials.

In addition to recycled content, the project team will consider the use of rapidly renewable materials and Forest Stewardship Council (FSC) certified lumber to help preserve natural resources.

| | | N |
|---|---|---|

### Building Reuse, Maintain 75% of Existing Shell

MR Credit 1.1

- This credit is not applicable to the project

| Y | | |
|---|---|---|

### Construction Waste Management, Divert 50%

MR Credit 2.1

- Perform construction waste management

| | ? | |
|---|---|---|

### Resource Reuse, Specify 5%

MR Credit 3.1

- Reuse the existing building foundation/pilings
  Barrier: Verify the load capacity
- Reuse the existing scale house
  Benefit: Existing scale houses are only 2 years old
  Benefit: Scale houses are designed to be portable
- Reuse building materials from the existing transfer station
- Reuse roof from the existing transfer station for the new smaller buildings
- Reuse existing compactors
  Barrier: Compactors may be too old
- Reuse scales and scale house
- Keep existing fuel tank
- Reuse or rent formwork
- Make daily cover out of waste soil
  Benefit: Use for Cedar Hills
- Use salvaged building materials

| Possible | Potential | Unlikely |
| --- | --- | --- |

## Y | | — Recycled Content, Specify 5%

MR Credit 4.1

- Recycle concrete from the road and building
  Benefit: Neighborhood/adjacent site recycling potential
  Barrier: Could make on-site staging difficult
- Use fly-ash in concrete
- Use recycled carpet products
- Use recycled plastic/composite lumber products
- Use recycled resilient flooring and tire stops

## Y | | — Local/Regional Materials, 20% Manufactured Locally

MR Credit 5.1

- Specify local/regional materials

## | ? | — Local/Regional Materials, of 20% Above, 50% Harvested Locally

MR Credit 5.2

- Use local concrete aggregate

## | ? | — Rapidly Renewable Materials

MR Credit 6

- Use rubber flooring in the TSO area

## Y | | — Certified Wood

MR Credit 7

- Use FSC certified wood for formwork and cabinetry
- Use FSC certified wood doors

Possible | Potential | Unlikely

## Indoor Environmental Quality

Possible Points 15

The health, safety and retention of skilled employees will drive design considerations when designing for good Indoor Environmental Quality (IEQ). Indoor air contamination control and daylighting are the primary strategies for a healthy IEQ. Continuous contaminant monitoring of each tipping floor bay will be tied into a control system that will switch on fans during alarms to alleviate potential hazards. Contaminant reduction will also occur through Construction Indoor Air Quality Management and the use of low-VOC materials. CO2 monitoring located in the breathing zone of occupant areas will be used to reduce energy demand and improve indoor air conditions.

Daylighting and views will be provided to all occupied spaces for all buildings. Windows will be operable to allow employees to have control over their working environment. High efficiency HVAC filters will be used to remove contaminate from the air prior to distribution into the building.

| Y | | |

### Minimum IAQ Performance

EQ Prerequisite 1

- Meet ASHRAE 55-2004

| Y | | |

### Environmental Tobacco Smoke (ETS) Control

EQ Prerequisite 2

- No smoking within 25 feet of the building

| Y | | |

### Carbon Dioxide (CO2) Monitoring

EQ Credit 1

- Install CO2 monitoring for the tipping floor and large occupancy rooms
- Monitor air for CO, CO2, methane gas contaminants

| Y | | |

### Increase Ventilation Effectiveness

EQ Credit 2

- Provide integrated ventilation control - tie natural and mechanical ventilation
- Use under floor air in scale house to increase ventilation
  Benefit: Will be beneficial if new scale house is used
  Barrier: Existing scale houses may be reused

| Y | | |

### Construction IAQ Management Plan, During Construction

EQ Credit 3.1

- Implement a Construction IAQ plan

| | ? | |

### Construction IAQ Management Plan, Before Occupancy

EQ Credit 3.2

- Install MERV 13 filters in HVAC system

| Possible | Potential | Unlikely | |
|---|---|---|---|
| Y | | | **Low-Emitting Materials, Adhesives & Sealants** |

EQ Credit 4.1

- Use low-VOC adhesives and sealants

| Possible | Potential | Unlikely | |
|---|---|---|---|
| Y | | | **Low-Emitting Materials, Paints** |

EQ Credit 4.2

- Use low-VOC paint

| Possible | Potential | Unlikely | |
|---|---|---|---|
| Y | | | **Low-Emitting Materials, Carpet** |

EQ Credit 4.3

- Install low-VOC carpets

| Possible | Potential | Unlikely | |
|---|---|---|---|
| Y | | | **Low-Emitting Materials, Composite Wood** |

EQ Credit 4.4

- Use urea-formaldehyde free composite wood products

| Possible | Potential | Unlikely | |
|---|---|---|---|
| Y | | | **Indoor Chemical and Pollutant Source Control** |

EQ Credit 5

- Install wash/mist systems to keep skylights clean and control dust
- Install walk-off mats at entrances and transition zones
- Use misting system with odor controls

| Possible | Potential | Unlikely | |
|---|---|---|---|
| | ? | | **Controllability of Systems, Perimeter** |

EQ Credit 6.1

- Install a daylight dimming system for electric lights

| Possible | Potential | Unlikely | |
|---|---|---|---|
| | | N | **Controllability of Systems, Non-perimeter** |

EQ Credit 6.2

- Install occupancy sensors in TSO area
- Provide occupant controls of building systems
- Install building controls in a common location

| Possible | Potential | Unlikely | |
|---|---|---|---|
| Y | | | **Thermal Comfort, Compliance with ASHRAE 55-1992** |

EQ Credit 7.1

- Maintain positive pressure in scale house

| Possible | Potential | Unlikely | |
|---|---|---|---|
| Y | | | **Thermal Comfort, Permanent Monitoring System** |

EQ Credit 7.2

- Install humidity monitors in occupied areas

| Possible | Potential | Unlikely |
|---|---|---|
| Y | | |

## Daylight and Views, Daylight 75% of Spaces

EQ Credit 8.1

- Daylight all buildings
- Daylight the tipping floor
- Provide interior and exterior shading to reduce glare
  Barrier: No landscape--vector control
  Note: Investigate building integrated systems
- Install daylight control systems

| Possible | Potential | Unlikely |
|---|---|---|
| Y | | |

## Daylight and Views, Views for 90% of Spaces

EQ Credit 8.2

- Provide views to the outside in all buildings

Possible Potential Unlikely

## Innovation & Design Process

Possible Points 5

There are several ways in which the design team will consider going beyond the requirements of LEED to provide as "Green" a building as possible within the budget constraints of the project. Several of these ideas are captured below:

### Y Innovation in Design

ID Credit 1.1

- Ecological bird control
  Barrier: SeaTac has existing regulations
- Green education program
- Provide integrated pest management

### Y Innovation in Design

ID Credit 1.2

- Creat rain gardens
- Art integration into structures
- Enhance the I-5 view corridor
- Reduce noise pollution
- Provide acoustical treatment for the TSO area
- Reduce reverberation in the tipping floor area
- Sound-proof the compactors
  Benefit: This will benefit the surrounding community

### Y Innovation in Design

ID Credit 1.3

- No PVC - use HDPE
- Investigate alternative pipe materials
- Investigate new retaining wall technologies
- Use fuel-efficient loading equipment
- Specify anti-fatigue surfaces
- Use armor-coating for tipping floor
  Benefit: Reduced maintenance/lifecycle costs
- Use durable materials for building
- Use pigment in concrete instead of paint
  Benefit: Reduced maintenance/lifecycle costs
- Use structural materials that require no finish surfaces
- Reuse over-excavated material for topsoil

Possible | Potential | Unlikely

| | ? | | ## Innovation in Design

ID Credit 1.4

- Bike lane on access road
- Install an access road with planned connections
  Benefit: This could be an community asset
- Improve intersection at south entrance
  Benefit: Could be a development catalyst
  Barrier: May be outside scope of the project
- Provide easy access to HHW area
  Barrier: May cause traffic conjestion
- Address regional traffic issues
- Use equipment with catalytic mufflers
- Provide a combined free and fee recycling area
- Reduce interior travel distances for employees
- Design safe employee walkways

| Y | | | ## LEED™ Accredited Professional

ID Credit 2

- There are several LEED Accredited Professional on the project team

# LEED Scorecard
## Pre-Design Phase

| Easy | Moderate | Difficult | | | |
|---|---|---|---|---|---|
| 36 | 13 | 7 | **Preliminary LEED Status is Silver** | Easy Only 36   Easy + Moderate 49 | All Points 56 |

Official LEED Ratings: Certified: 26-32 Silver Rating: 33-38 Gold Rating: 39-51 Platinum Rating: 52 +

| Easy | Moderate | Difficult | | | Points |
|---|---|---|---|---|---|
| 6 | 3 | 3 | **Sustainable Sites** | | 14 Possible Points |
| Y | | | Prerequisite 1 | Erosion & Sedimentation Control | 0 |
| 1 | | | Credit 1 | Site Selection | 1 |
| Not Attempting | | | Credit 2 | Urban Redevelopment | 1 |
| | | 1 | Credit 3 | Brownfield Redevelopment | 1 |
| Not Attempting | | | Credit 4.1 | Alternative Transportation, Public Transportation Access | 1 |
| 1 | | | Credit 4.2 | Alternative Transportation, Bicycle Storage & Changing Rooms | 1 |
| | 1 | | Credit 4.3 | Alternative Transportation, Alternative Fuel Refueling Stations | 1 |
| 1 | | | Credit 4.4 | Alternative Transportation, Parking Capacity | 1 |
| | 1 | | Credit 5.1 | Reduced Site Disturbance, Protect or Restore Open Space | 1 |
| | | 1 | Credit 5.2 | Reduced Site Disturbance, Development Footprint | 1 |
| | | 1 | Credit 6.1 | Stormwater Management, Rate and Quantity | 1 |
| 1 | | | Credit 6.2 | Stormwater Management, Treatment | 1 |
| | 1 | | Credit 7.1 | Landscape & Exterior Design to Reduce Heat Islands, Non-Roof Surfaces | 1 |
| 1 | | | Credit 7.2 | Landscape & Exterior Design to Reduce Heat Islands, Roof Surfaces | 1 |
| 1 | | | Credit 8 | Light Pollution Reduction | 1 |
| 5 | | | **Water Efficiency** | | 5 Possible Points |
| 1 | | | Credit 1.1 | Water Efficient Landscaping, Reduce by 50% | 1 |
| 1 | | | Credit 1.2 | Water Efficient Landscaping, No Potable Use or No Irrigation | 1 |
| 1 | | | Credit 2 | Innovative Wastewater Technologies | 1 |
| 1 | | | Credit 3.1 | Water Use Reduction, 20% Reduction | 1 |
| 1 | | | Credit 3.2 | Water Use Reduction, 30% Reduction | 1 |
| 7 | 4 | | **Energy & Atmosphere** | | 17 Possible Points |
| Y | | | Prerequisite 1 | Fundamental Building Systems Commissioning | 0 |
| Y | | | Prerequisite 2 | Minimum Energy Performance | 0 |
| Y | | | Prerequisite 3 | CFC Reduction in HVAC&R Equipment | 0 |
| 2 | | | Credit 1.1 | Optimize Energy Performance, 20% New /10% Existing | 2 |
| 2 | | | Credit 1.2 | Optimize Energy Performance, 30% New /20% Existing | 2 |
| | 2 | | Credit 1.3 | Optimize Energy Performance, 40% New /30% Existing | 2 |
| Not Attempting | | | Credit 1.4 | Optimize Energy Performance, 50% New /40% Existing | 2 |
| Not Attempting | | | Credit 1.5 | Optimize Energy Performance, 60% New /50% Existing | 2 |
| | 1 | | Credit 2.1 | Renewable Energy, 5% Contribution | 1 |
| Not Attempting | | | Credit 2.2 | Renewable Energy, 10% Contribution | 1 |
| Not Attempting | | | Credit 2.3 | Renewable Energy, 20% Contribution | 1 |
| 1 | | | Credit 3 | Additional Commissioning | 1 |
| 1 | | | Credit 4 | Ozone Depletion | 1 |
| 1 | | | Credit 5 | Measurement & Verification | 1 |
| | 1 | | Credit 6 | Green Power | 1 |

# LEED Scorecard
Pre-Design Phase

| Easy | Moderate | Difficult | | | |
|---|---|---|---|---|---|
| 4 | 2 | 2 | **Materials & Resources** | | 13 Possible Points |
| Y | | | Prerequisite 1 | Storage & Collection of Recyclables | 0 |
| Not Attempting | | | Credit 1.1 | Building Reuse, Maintain 75% of Existing Shell | 1 |
| Not Attempting | | | Credit 1.2 | Building Reuse, Maintain 100% of Shell | 1 |
| Not Attempting | | | Credit 1.3 | Building Reuse, Maintain 100% Shell and 50% Non-Shell | 1 |
| 1 | | | Credit 2.1 | Construction Waste Management, Divert 50% | 1 |
| | 1 | | Credit 2.2 | Construction Waste Management, Divert 75% | 1 |
| | | 1 | Credit 3.1 | Resource Reuse, Specify 5% | 1 |
| Not Attempting | | | Credit 3.2 | Resource Reuse, Specify 10% | 1 |
| 1 | | | Credit 4.1 | Recycled Content, Specify 5% | 1 |
| 1 | | | Credit 4.2 | Recycled Content, Specify 10% | 1 |
| 1 | | | Credit 5.1 | Local/Regional Materials, 20% Manufactured Locally | 1 |
| | | 1 | Credit 5.2 | Local/Regional Materials, of 20% Above, 50% Harvested Locally | 1 |
| Not Attempting | | | Credit 6 | Rapidly Renewable Materials | 1 |
| | 1 | | Credit 7 | Certified Wood | 1 |
| 10 | 3 | 2 | **Indoor Environmental Quality** | | 15 Possible Points |
| Y | | | Prerequisite 1 | Minimum IAQ Performance | 0 |
| Y | | | Prerequisite 2 | Environmental Tobacco Smoke (ETS) Control | 0 |
| 1 | | | Credit 1 | Carbon Dioxide (CO2) Monitoring | 1 |
| | | 1 | Credit 2 | Increase Ventilation Effectiveness | 1 |
| 1 | | | Credit 3.1 | Construction IAQ Management Plan, During Construction | 1 |
| | 1 | | Credit 3.2 | Construction IAQ Management Plan, Before Occupancy | 1 |
| 1 | | | Credit 4.1 | Low-Emitting Materials, Adhesives & Sealants | 1 |
| 1 | | | Credit 4.2 | Low-Emitting Materials, Paints | 1 |
| 1 | | | Credit 4.3 | Low-Emitting Materials, Carpet | 1 |
| 1 | | | Credit 4.4 | Low-Emitting Materials, Composite Wood | 1 |
| 1 | | | Credit 5 | Indoor Chemical and Pollutant Source Control | 1 |
| | 1 | | Credit 6.1 | Controllability of Systems, Perimeter | 1 |
| | | 1 | Credit 6.2 | Controllability of Systems, Non-perimeter | 1 |
| 1 | | | Credit 7.1 | Thermal Comfort, Compliance with ASHRAE 55-1992 | 1 |
| | 1 | | Credit 7.2 | Thermal Comfort, Permanent Monitoring System | 1 |
| 1 | | | Credit 8.1 | Daylight and Views, Daylight 75% of Spaces | 1 |
| 1 | | | Credit 8.2 | Daylight and Views, Views for 90% of Spaces | 1 |
| 4 | 1 | | **Innovation & Design Process** | | 5 Possible Points |
| 1 | | | Credit 1.1 | Innovation in Design | 1 |
| 1 | | | Credit 1.2 | Innovation in Design | 1 |
| 1 | | | Credit 1.3 | Innovation in Design | 1 |
| | 1 | | Credit 1.4 | Innovation in Design | 1 |
| 1 | | | | LEED™ Accredited Professional | 1 |

## APPENDIX: Eco Charrette Break-Out Groups

**Bow Lake Transfer Station**

After the brainstorming session, the project team split into two groups to address the design considerations generated. The key ideas and strategies from these focus groups are outlined below, along with key concepts that emerged from the recap presentations.

## Site Group

The Site Group addressed questions regarding the exterior environment, such as circulation, context, landscape, stormwater and open space. The group's discussion also included ideas about the structure of processes and staffing related to King County Solid Waste Division, as described below.

**Ideas Presented:**

- Separate the refuse stream. The Bow Lake Transfer Station is currently configured to accommodate both waste and recycling. However many issues of redundancy arise from having a single entry and weighing station, which adds to circulation congestion and longer vehicle idling periods. In the interest of a more efficient process, it was proposed that the transfer station either have separate entry and circulation paths for different waste types, or to switch to a waste-only facility. Separate paths would likely require additional staffing at the facility to accommodate parallel operations. A waste-only facility would require the county to make provisions for additional recycling centers. In either case, an operational and staffing adjustment would have to take place, which is a decision made by King County.
- Balanced cut and fill. The north end of the site currently contains a large mound of earth deposited from previous site developments. To develop this area of the site, this earth must be either leveled or removed. Therefore, it is proposed that to alleviate costs, the overall site should maintain a balanced cut to fill ratio. Earth from the north end of the site could be used to level the slope at the south end of the site.
- Controlled stormwater runoff. Stormwater management on the site is constrained by the existing landfill material below the site, resulting in an inability to infiltrate into the soil. Therefore, the stormwater must be captured on-site to avoid impacts to watersheds downstream of the site. The site slopes downward to the east, which is away from the proposed

structures. Therefore, it was proposed that stormwater be captured at this edge of the site, retained and treated in stormwater vaults.

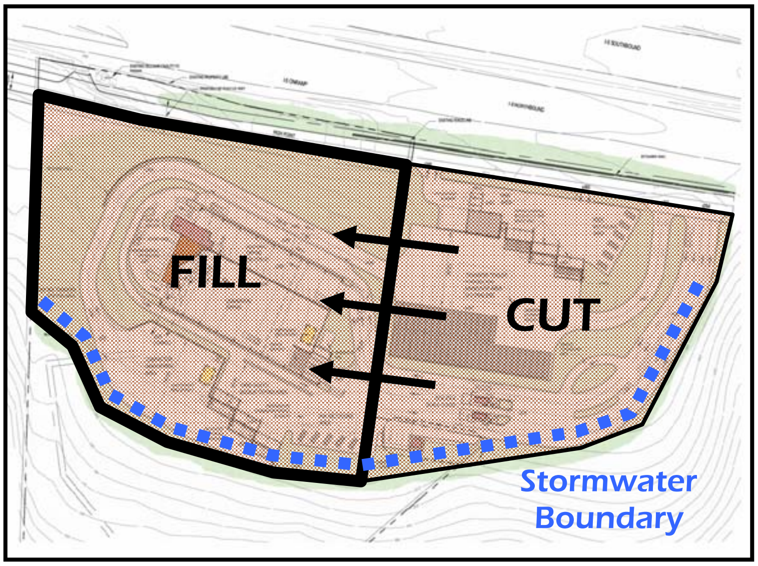



**Fig 1. Site concept diagram.**

## Building Envelope and Systems Group

The Building Envelope and Systems Group addressed questions regarding how the interior and exterior merge, how the building is ventilated & conditioned, how daylighting is provided and how the building is controlled.

**Ideas Presented:**

- <u>Building orientation for sun & wind</u>. The existing Bow Lake Transfer station is located on the southern side of the site with a north-south orientation. The project team currently intends to reuse the existing foundation system, in whole or in part, for the new transfer station. However, a concurrent proposal is to orient the building to maximize daylight exposure and preserve opportunities for natural ventilation. Sun exposure will primarily affect the east, south and west facades. However daylight modeling is recommended to examine daylight penetration. Site topography and prevailing winds create a "wind tunnel" effect from the south, creating an opportunity for primary cross ventilation along the north-south axis. However, this must be coordinated with vehicle entrances to provide wind blockage at ground level during colder months.

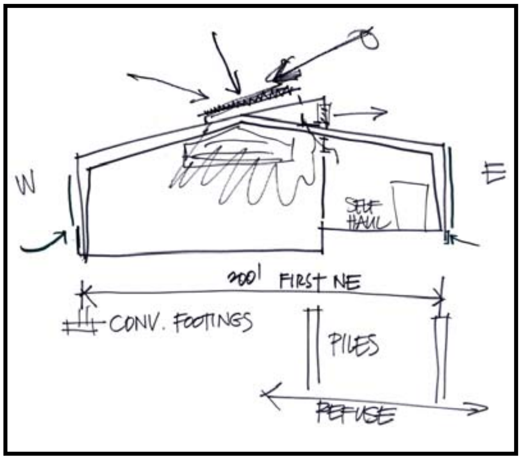



**Fig 2. Transfer Station section with overhead daylighting**

- Daylighting. The design of the building envelope will be the key to providing sufficient daylight for the Bow Lake Transfer Station. Lighting will be provided by a combination of side windows and a series of panelized diffuse skylights. However, the key concern from a visual comfort and operations safety standpoint is the control of glare and contrast issues. This requires solutions that provide uniform light levels, transitions between indoor and outdoor, and reduced reflected light. Although these issues may be resolved by solar shading devices and lighting control systems, a daylighting study is recommended to determine optimized building envelope geometry and solar control strategies.

- Natural Ventilation. Ventilation in the Bow Lake Transfer Station will be achieved through a combined mechanical and passive system. The system will be designed to maintain equal pressurization while allowing on-demand exhaust for contaminant release. End wall louvers, side wall louvers and ridge vents will provide natural cross-ventilation, dependent on building orientation and bay configuration. The roof angle and ridge design will contribute to an airflow pattern that minimizes “dead zones” and prevents dirt and debris from settling on the skylights. Mechanical ventilation will be operated as supplemental safety exhaust, using centralized fan units that are easily accessible from a catwalk. Filters may be necessary to provide sufficient indoor air quality.

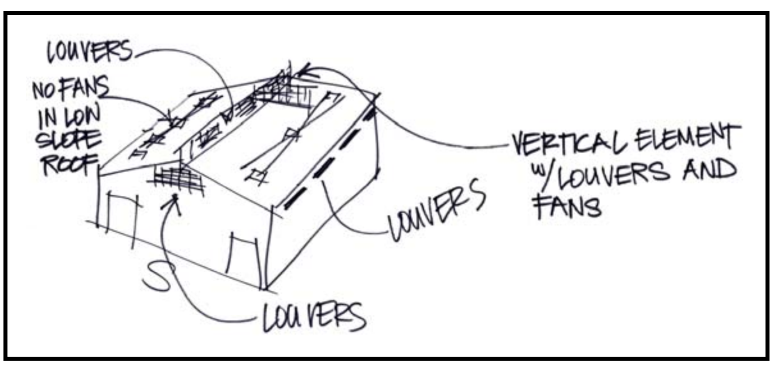



**Fig 3. Axonometric sketch of inlet/outlet locations on the building envelope**