Native Plants in the Urban Environment:

The 2017 Wascana Landscape and Irrigation Master Plan

SCATLIFF + MILLER + MURRAY
visionary urban design + landscapes
Royalwood Subdivision – Winnipeg, Manitoba
Canadian Museum for Human Rights – Winnipeg, Manitoba
Project Goals:

1. To complete the preliminary design for the replacement and modernization of the existing / old irrigation system.

1* To make the landscape less dependent on irrigation by defining the areas which need to be irrigated – taking into account how the land is used, the intensity of use and the impact of special events on the landscape.
• Wascana Park: approximately 225 hectares of permeable vegetated lands

• In Saskatchewan, irrigation is the largest user of freshwater (including agricultural uses), approximately 550,000,000 kilolitres of water are used annually for irrigation (source: Saskatchewan Eco-Network).
• Maintenance costs for maintaining the existing vegetated groundcover area through the growing season (16 weeks, not including spring/fall clean up) is approximately $450,000.00 per year (and is escalating based on the condition of the existing irrigation system).

• The capital cost to replace the existing irrigation system is approximately $28M
GUIDING PRINCIPLES

1. Achieve a reduction in long term maintenance needs / costs.

2. Maintain a civic leading high standard for landscape quality.

3. Improved landscape resilience (drought tolerance, reduced fertilizer needs, removal of weedy species, improved erosion control).

4. Promote sustainability in landscape maintenance and design approach.

WCA - LANDSCAPE / IRRIGATION MASTER PLAN
### AREA 1 - EXISTING CONDITIONS

**Area:** Area 1  
**Cover Class:** Wet - Shoreline, Dense - Treed, Loose - Treed  
**Specific Site (sq.m.)**  
- Wet - Shoreline: 9,351
- Dense - Treed: 112,279
- Loose - Treed: 35,937

#### Assumptions:
- **Annual Regina Precipitation (mm/year):** 363.9
- **Total Wascana Landscape Area (sq.m.):** 2,244,041
- **Total Irrigated Area (sq.m.):** 1,522,486

#### Project Variables:
- **Labour cost: $/hour:** 21.00
- **Cost of Power: $/kWhour:** 0.07
- **Cost of Fuel: $/litre:** 1.20
- **Cost of City Water: $/m3:** 1.72

#### Maintenance
- **Annual Maintenance (full site):** $200,000.00
- **Replacement value (current):** $22,000,000
- **Lifespan:** 10 years
- **Replacement cost ($/sq.m./year):** 0.00891
  - **Annualized Equipment replacement cost (site specific):** $83.34

#### Equipment (based on existing system)
- **Annual Maintenance (full site):** $200,000.00
- **Replacement cost ($/sq.m./year):** 1.96
  - **Site Specific Replacement Cost (per year):** $18,335.62

#### Irrigation
- **Annual Maintenance (based on site specific area):** $833.44
- **Water use:
  - Amount of water/cycle (m^3):** 0
  - Cost of Water (City only): -

#### Mowing
- **Annual Maintenance (full site):** $10,000.00
- **Replacement cost ($/sq.m./year):** 0.00891
  - **Annualized Equipment replacement cost (site specific):** $83.34

#### Water use
- **Water Usage / cycle (m depth):** 0.008
- **Amount of water/cycle (m^3):** 0
  - **Cost of Water (City only):** -

#### City Water Usage
- **WATER USAGE (m^3/year):** 0
  - **ANNUAL IRRIGATION COST:** $19,169.06
  - **ANNUAL MOWING COST:** $179.88

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Maintenance activities are based on a 16 week cycle between May 15 and September 15.
GROUNDCOVER APPROACH (CONVERSION)

• This approach focuses on conversion of existing groundcover to one with greater drought tolerance and resilience, no fertilizer requirements, and reduced long term weed control needs;
  a. To reduce irrigation requirements on irrigated land;
  b. To remediate non-irrigated sites to establish attractive, non-invasive groundcover.

• This approach is to be considered in areas where irrigation is removed and the existing cover is dependent on regular irrigation.

• Where weeds significantly compromise the aesthetic of the landscape and pose a serious risk of spreading into adjacent areas.

• Where weed infestation levels cannot be efficiently reversed through groundcover improvement.

• Areas currently not irrigated generally fall into category of ‘naturalized’ or rough lawn areas which are either not mowed, or are mowed once or twice during the growing season. These areas are, in large part, occupied by grassy and broadleaf weeds, although some hardy locally native grass species have established in small patches (particularly western wheatgrass).
GROUNDCOVER APPROACH (IMPROVEMENT)

Groundcover improvement through weed control and reinforcement seeding is recommended:

- As part of an overall, landscape-level, weed management strategy;
- Where resources are not in place to undertake complete large-scale groundcover conversion to more desirable cover;
- Where weeds, especially broadleaf weeds, significantly compromise the aesthetic of the landscape;
- Where it has been deemed important to prevent the spread of weeds into adjacent lands;
- To improve manicured landscapes/lawns;
- To improve designated wildlife habitat;
- To identify groundcover conversion sites;
- Where the remaining grassy cover (following broadleaf weed control) is generally acceptable and can remain in place, or can be managed to minimize weeds spreading into other areas;
- Where grassy vegetation should be left in place to mitigate potential erosion (e.g. shorelines).
AREA 1 - MASTER PLAN

Area: Area 1
Cover Class: Irrigated - High Maintenance
Irrigated - Turf Conversion
Irrigated - Alternative Maintenance
Non-Irrigated - Turf Conversion
Specific Site (sq.m.)
32,143
164,504
34,798

Assumptions:
Annual Regina Precipitation (mm/year)
363.9
Total Wascana Landscape Area (sq.m.)
2,220,131

Total Irrigated Area (sq.m.)
1,179,384

Project Variables:
Labour cost: $/hour
21.00
Cost of Power: $/kWhour
0.07
Cost of Fuel: $/litre
1.20
Cost of City Water: $/m3
1.72

Irrigation Equipment (based on existing system)
Annual Maintenance (full site)
10,000.00
Replacement value (current)
22,000,000
Lifespan (years)
25
Replacement cost ($/sq.m./year)
0.75
Site Specific Replacement Cost (per year)
23,983.27

Maintenance ($/sq.m./year)
0.00
Annual Maintenance (based on site specific area)
144.78
Replacement cost ($/sq.m./year)
0.40
Site Specific Replacement Cost (per year)
200,000.00
Lifespan
10
Replacement cost ($/sq.m./year)
0.0901
Annualized Equipment replacement cost (site specific)
289.56
Fuel (litres) / hour
4.5
Fuel cost per mobilization
19.29

Labour
Area covered (sq.m.) / hour
9000
Number of mobilizations / year
16
Annual Mowing Labour Cost
1,199.99
ANNUAL MOWING COST
1,942.89

Fertilizing
Assuming 1 mechanized broadcast spreader

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# MAINTENANCE COST ANALYSIS

## EXISTING COSTS

The annual maintenance cost for groundcover during the growing season (assumed to be May 15 to September 15) is:

<table>
<thead>
<tr>
<th>Cost Type</th>
<th>Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Irrigation Cost</td>
<td>$202,064.00</td>
</tr>
<tr>
<td>Annual Mowing Cost</td>
<td>$90,027.14</td>
</tr>
<tr>
<td>Annual Fertilizing Cost</td>
<td>$49,352.03</td>
</tr>
<tr>
<td>Annual Weed Mgmt Cost</td>
<td>$88,269.28</td>
</tr>
<tr>
<td><strong>Annual Total</strong></td>
<td><strong>$429,712.45</strong></td>
</tr>
</tbody>
</table>

1,522,486 m² (152 ha) of irrigated land
721,556 m² (72 ha) of non-irrigated land.

490,875 m³ (kiloliters) of water for irrigation

## PROPOSED COSTS

The annual maintenance cost for groundcover during the growing season (assumed to be May 15 to September 15) is:

<table>
<thead>
<tr>
<th>Cost Type</th>
<th>Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Irrigation Cost</td>
<td>$96,473.08</td>
</tr>
<tr>
<td>Annual Mowing Cost</td>
<td>$65,116.88</td>
</tr>
<tr>
<td>Annual Fertilizing Cost</td>
<td>$31,518.23</td>
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<tr>
<td>Annual Weed Mgmt Cost</td>
<td>$33,995.60</td>
</tr>
<tr>
<td><strong>Annual Total</strong></td>
<td><strong>$227,103.79</strong></td>
</tr>
</tbody>
</table>

1,179,384 m² (118 ha) of irrigated land
1,040,746 m² (104 ha) of non-irrigated land.

345,469 m³ (kiloliters) of water for irrigation

50% decrease in maintenance costs
30% decrease in water usage
# CONSTRUCTION COSTS

## Revegetation Construction Costs
(Over 24 Year Period – approximately $100,000 per year)

<table>
<thead>
<tr>
<th>Area</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) South of College Avenue</td>
<td>$750,000</td>
</tr>
<tr>
<td>(2) Wascana Headland</td>
<td>$160,000</td>
</tr>
<tr>
<td>(3) Legislative Grounds</td>
<td>$410,000</td>
</tr>
<tr>
<td>(4) Family Parkland</td>
<td>$215,000</td>
</tr>
<tr>
<td>(5) Performing Arts Centre</td>
<td>$195,000</td>
</tr>
<tr>
<td>(6) Douglas Park</td>
<td>$170,000</td>
</tr>
<tr>
<td>(7) University of Regina and Research Centre</td>
<td>$415,000</td>
</tr>
</tbody>
</table>

Subtotal: $1,940,000

20% Contingency: $388,000

Consultant Fees (Budget): $500,000

(estimated based on 24 years of professional service)

Total: $2,828,000

Note: all prices are in 2015/16 Canadian funds and do not take inflation into account on applicable taxes.

*Areas 1, 2, 4 and 6 are related to Phase 1 (North Side) irrigation system, and have been considered from a phasing perspective as areas of initial review/design.

## Irrigation Construction Costs
(Over 2 Year Period)

<table>
<thead>
<tr>
<th>Area</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) South of College Avenue</td>
<td>$1,325,500</td>
</tr>
<tr>
<td>(2) Wascana Headland</td>
<td>$906,000</td>
</tr>
<tr>
<td>(3) Legislative Grounds</td>
<td>$770,000</td>
</tr>
<tr>
<td>(4) Family Parkland</td>
<td>$1,810,000</td>
</tr>
<tr>
<td>(5) Performing Arts Centre</td>
<td>$1,223,000</td>
</tr>
<tr>
<td>(6) Douglas Park</td>
<td>$4,375,000</td>
</tr>
<tr>
<td>Willow Island Pump House Upgrade</td>
<td>$460,000</td>
</tr>
<tr>
<td>Spruce Island Pump House Upgrade</td>
<td>$460,000</td>
</tr>
<tr>
<td>Decommissioning of Pumping Stations (2)</td>
<td>$100,000</td>
</tr>
<tr>
<td>Main supply line 250 mm (10&quot;) diameter</td>
<td>$5,000,000</td>
</tr>
</tbody>
</table>

Subtotal: $16,429,500

Contingency 20%: $3,285,900

Engineering (Budget – approximately 8.5%): $1,400,000

Total: $21,115,400

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