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HARMONY Developments Inc.

V1. 2022

HARMONY WATER MANAGEMENT PLAN

Our Commitment to Responsible, Sustainable & Innovative Water Stewardship

HARMONY ROCKY VIEW COUNTY

HARMONY WATER MANAGEMENT PLAN

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INTRODUCTION

Intent

The intent of the Harmony Water Management Plan is to outline Harmony's ongoing commitment to the management of water whether it be in the form of potable water, raw water, sanitary sewage, reclaimed water or stormwater.
The Harmony Water Management Plan is a living document and will change as required as the community evolves.

At the outset of the planning of Harmony a set of guiding principles was developed. Two principles of particular importance guided the planning and design of the water systems:

- Respecting the County and neighbours of Harmony by providing amenities that will benefit all of Springbank and by creating a more "Sustainable Springbank";

- Taking a holistic approach to the community design by focusing on sustainable practices through "the provision of high quality water and wastewater services through responsible, sustainable, and innovative stewardship of resources", and through the application of "Smart Growth" principles which include the effective use of resources in order to reduce the impact of development on the land and infrastructure.

The Harmony Water Management Plan outlines how various parties in Harmony can ensure these principles used in the planning of the water system can be sustained in perpetuity for the benefit not only of today but also future generations.

Definitions

a. **Potable Water** – Water that has been treated for human consumption to the standards dictated by Alberta Environment and Parks.

b. **Raw Water** – Untreated water from either the Bow River or one of the lakes or ponds within Harmony that is suitable for irrigation purposes and human consumption once treated through the potable water system.

c. **Reclaimed Water** – Water that has been treated at the Wastewater Treatment Plant to a standard suitable for irrigation in accordance with the approval granted by Alberta Environment and Parks.

d. **Stormwater** – Water that accumulates in the drainage conveyance system, wetlands, ponds, and lakes from rainfall runoff or snowmelt runoff. This water has not been treated for human consumption.

e. **Wastewater (Sanitary Sewage)** – Water that is discharged from residential, commercial, institutional or industrial sites that requires treatment before it can be safely returned to the environment or reused.

f. **Lawn Basin** – A grated inlet located at the point where stormwater is collected via residential ditch or conveyance channel and enters the stormwater piping system.

g. **Irrigated Land** – Land that is supplied with water by a human or mechanical application process.

Parties Involved

The sustainable management of all the water systems within Harmony requires the involvement of a variety of parties at many different stages:

a. **Harmony Advanced Water Systems Corporation (HAWSCO)** – operates as the water utility provider and is directly responsible for the ownership, operation and maintenance and customer billing associated for the water and wastewater systems within Harmony which are outlined in Section 3. **HAWSCO has a franchise agreement established with Rocky View County to provide these services and is regulated by the Alberta Utilities Commission.** HAWSCO is also responsible for ensuring the maintenance of all overland stormwater conveyance routes, stormwater ponds, constructed wetlands and water features located in Harmony.

b. **Owners Association of Harmony (OAH)** – is responsible for the following key functions as they pertain to water management in Harmony: irrigation of selected parks and boulevards, and implementation and evolution of the Harmony Water Management Plan.

c. **Rocky View County** – as the municipal authority Rocky View County is responsible for infrastructure located within County municipal reserve lands and road right-of-ways, which includes, but is not limited to, underground storm sewers and roadside swales.

d. **Property Owners** – owners are directly responsible for water management practices within their private lots and also have a responsibility as members of the OAH and as customers of HAWSCO to fulfill their obligations to the respective organizations.

e. **Golf Course Operator** – the golf course operator is responsible for the operation and maintenance of the irrigation system that disposes of the reclaimed water. The golf course operator is also primarily responsible for the operation and maintenance of stormwater conveyances, ponds, and outfalls within the limits of the golf course.

CONTACT LIST

Site Name: Harmony Water and Wastewater Treatment Plants

HAWSCo Customer Care

- Website: www.hawsco.ca
- Toll-Free: 1-855-9HA-WSCO (1-855-942-9726)
- Email: customercare@hawsco.ca
- Hours: Monday to Friday (excluding statutory holidays) - 8 AM to 4 PM

CONTACT	PHONE NUMBER	EMAIL
First Responders of an Emergency		
Fire Department	911	
Medical Service	911	
Police	911	
Poison Control	403.944.1414	
Government Agencies		
Alberta Environment Emergency Line	1.800.222.6514	
Alberta (Provincial) Laboratory	403.944.1200	
Alberta Health Services	1.866.408.5465	
Alberta Occupational Health & Safety	1.866.415.8690	
LPGERC (Liquid Petroleum Gas)	403.543.6090	
Transportation of Dangerous Goods	1.800.272.9600	
Customer Care Contacts		
Customer Care (Kelowna)	1.877.577.2112	
Service/Repair Contacts		
Electricity (Fortis)	403.310.2010	
Gas (ATCO)	403.245.7888	
Line Locators (AB 1st Call)	1.800.242.3447	

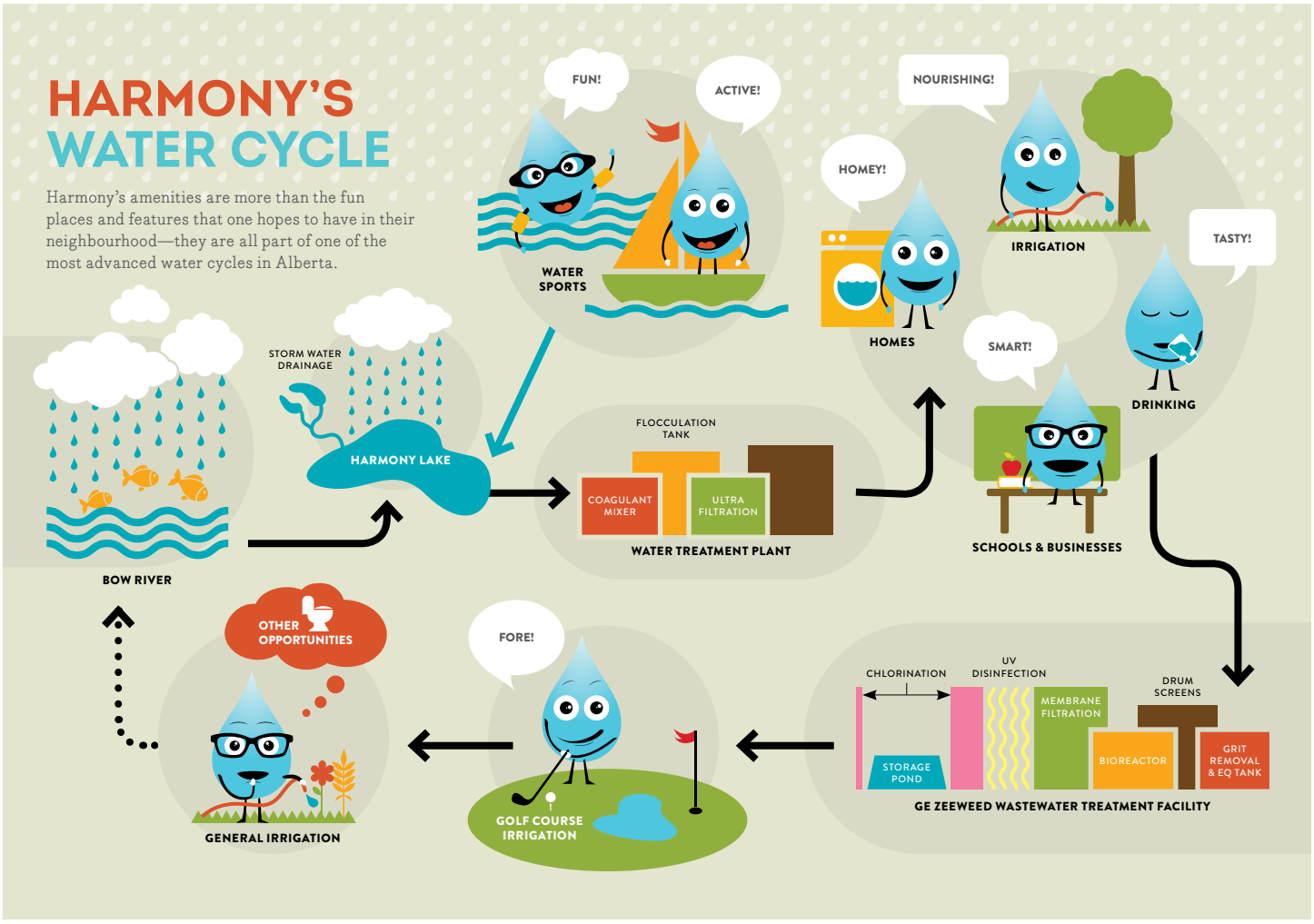
SYSTEM DESCRIPTION

Overview

Harmony reflects the integration of water systems that use and distribute water in a respectful manner to achieve triple bottom line objectives: environmental, social and financial. Each water system—potable water, raw water, reclaimed water, stormwater, and wastewater—has interaction and influence on others, requiring each system to be operated in a coordinated and comprehensive manner.

Water conservation, water reuse, protection of natural systems and valuing stormwater as a resource are all important principles that set Harmony apart from other communities.

Each water system—potable water, raw water, reclaimed water, stormwater, and wastewater—has interaction and influence on others.



KEY COMPONENTS OF HARMONY INCLUDE:

- Community lake that serves as a water supply storage reservoir, recreational amenity and stormwater management facility;
- Raw water intake on the Bow River;
- Potable water distribution system;
- Potable water treatment plant and storage reservoir;
- Sanitary sewer collection system;
- Wastewater treatment plant with reclaimed water storage pond;
- Reclaimed water for irrigation use;
- Extensive stormwater management system that consists of bioswales, greenways, constructed wetlands, storage ponds, supplemental water quality treatment systems and traditional stormwater sewers where necessary.

Water Systems

Harmony consists of five water systems that are critically integrated and vital to meeting the community's needs:

POTABLE WATER SYSTEM

Water is supplied from the Bow River and stored in Harmony Lake together with the stormwater runoff. A water license is held on the Bow River to match the anticipated potable water needs of the community at full buildout. The water is treated through an advanced membrane water treatment plant and then conveyed through a water distribution network that also provides fire protection and irrigation water to some areas within the community.

RAW WATER SYSTEM

The source of water for the raw water system is Harmony Lake with a pump station located at the water treatment plant. Raw water is supplied to the community through a dedicated irrigation system designed to irrigate select open space and landscaped areas within Harmony. It also provides a water supply to the golf course for initial development years when reclaimed water is not sufficient and in future years as a root zone flushing source so that grass and plant health can be maintained. Many properties in Harmony may have a raw water supply and meter in the future in addition to their potable water supply.

RECLAIMED WATER SYSTEM

Initially, reclaimed water will be utilized to irrigate golf course lands. If regulations permit, it is envisioned that reclaimed water could also be used for additional irrigation and within future commercial cells for toilet flushing—'setting the bar' for water use in future communities.

STORMWATER

The stormwater catchment area extends beyond the boundaries of Harmony. Stormwater is intrinsically affected by upstream land management and human activities.

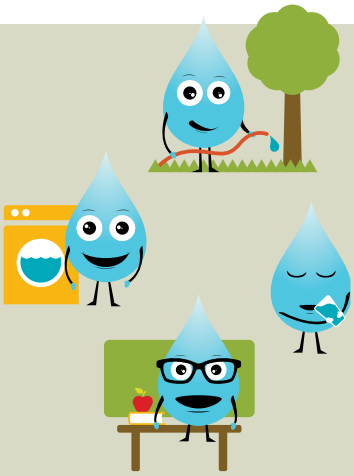
Stormwater is collected and conveyed largely via naturalized channel systems throughout the community that help to remove pollutants, promote evapotranspiration, and provide habitat for a variety of insects, plants, and wildlife. The system is supplemented with vegetated swales along roadways and constructed wetlands. Conventional piping is used only where necessary. Harmony Lake and the ponds within the golf course serve to store water for flood protection. Overflow from Harmony Lake and the ponds returns to the Bow River.

Runoff into Harmony Lake represents a significant source of raw water. There is therefore a direct relationship between stormwater runoff entering the lake and the need to import water from the Bow River.

It is important that all lands and activities within Harmony be managed and respected in order to protect the quality of raw water entering the lake and ultimately the potable water system.

IRRIGATION SYSTEM

The first stage of Harmony consists of three systems that feed irrigation: potable water, reclaimed water, and raw water systems. The use of raw and reclaimed water for irrigation reduces treatment demands on the potable water system and offers a more sustainable approach to irrigating.

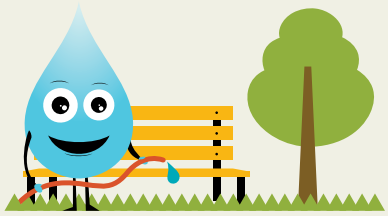


Potable Water Irrigation

The water source for residential irrigation in Stage 1 will be potable water supplied directly to each home or multi-family residence by the water treatment plant. Guidelines/restrictions will be in place to inform residents of water management practices that achieve desired water use balance and outcomes (refer to sections commencing on pages 8 and 17).

Reclaimed Water Irrigation

As an output of the wastewater treatment plant reclaimed water provides the primary source for irrigation of the golf course. Irrigation of the golf course with reclaimed water provides a necessary function to the overall water system in Harmony.



Raw Water Irrigation

Raw water is currently the water source for any irrigation systems installed in park space and boulevards. The preferred and long-term strategy involves a dedicated raw water distribution system which supplies raw water from Harmony Lake throughout Harmony for residential, commercial and open space irrigation usage.

WATER CONSERVATION

Harmony's water demand must be proactively managed to ensure sufficient water is available for future generations. Various design elements have been implemented to actively support the conservation of water from both an outdoor and indoor water use perspective. It is critical that these elements are maintained and supported to protect the long-term responsible management of water within Harmony.

Outdoor Water Demand Management

Irrigation has a significant water draw on communities. Currently all residential and commercial areas within Harmony will be irrigated with potable water while open space and parks will be irrigated with raw water. Opportunities to irrigate other lands with raw water present an opportunity to reduce operational demands and constraints on the potable water system. Responsible management of irrigation demand is imperative to manage and respect the water supply provided to Harmony residents.

IRRIGABLE DEMANDS

The community of Harmony has the opportunity to significantly reduce water consumed for irrigation and the quality of water released from each lot. **By optimizing landscape design through vegetation, soil structure and other materials, fundamental values of the sustainable community are reinforced.** For a sample list of plant species that typically require low water usage or are compatible with the local micro climate, refer to Appendix A: "Compatible Plant Material—Harmony Residential Lots"

a. **Landscape Design Requirements**
   With a maximum allocation of water available for irrigation annually, methods to maintain low water usage by each lot owner are necessary. This begins with the landscape design and corresponding plant material.

Turf grass is the highest consumer of water, while ornamental grasses, shrubs and trees typically require 30%–50% less water. Therefore, a balance in the ratio of turf grass to ornamental grasses, trees and shrubs planted and irrigated results in a significant decrease in water demand.

The overall availability of water within Harmony depends on the implementation of water-conscious landscape design. **Property owners are not to irrigate, by irrigation lines or manually or otherwise, more than 45% of the area of a lot.** This portion of irrigated land is referred to as the permitted irrigable area. Property owners are also not to plant turf or similar grass in more than 70% of the permitted irrigable area.

> ***Irrigated Land** is defined as land that is supplied with water by a human or mechanical application process.*

Alterations to an owner's landscape resulting in a design that exceeds these irrigation requirements must have the design reviewed and approved by HAWSCO. See Appendix B for examples of conceptual landscape plans that achieve the recommended ratios.

b. **Soil Structure Requirements**

Landscaped areas have been designed to include topsoil profiles that encourage the absorption and retention of precipitation, providing two benefits. First, less water is required from irrigation systems. Second, greater retention of precipitation reduces flood risk, environmental impact, and pollution to Harmony Lake—the community's water supply. The following shall be required:

- not to maintain less than 300mm of topsoil in the landscaped areas of the lot;
- not allow topsoil on the lot to suffer erosion;
- finished grade elevations and drainage patterns at time of construction completion shall be maintained by lot owners. Any alterations must be reviewed and approved by HAWSCO.

c. **Enforcement**

Enforcement of the landscaping parameters, listed above, is at the discretion of HAWSCO and others.

SHOULD HAWSCO BECOME AWARE OF VIOLATIONS, IT POSSESSES THE ABILITY TO ENFORCE THE LANDSCAPE PARAMETERS.

The following methods of enforcement may be used:

- issue of written warning
- issue of fine
- limitation of water supply

AUTOMATIC IRRIGATION SYSTEMS

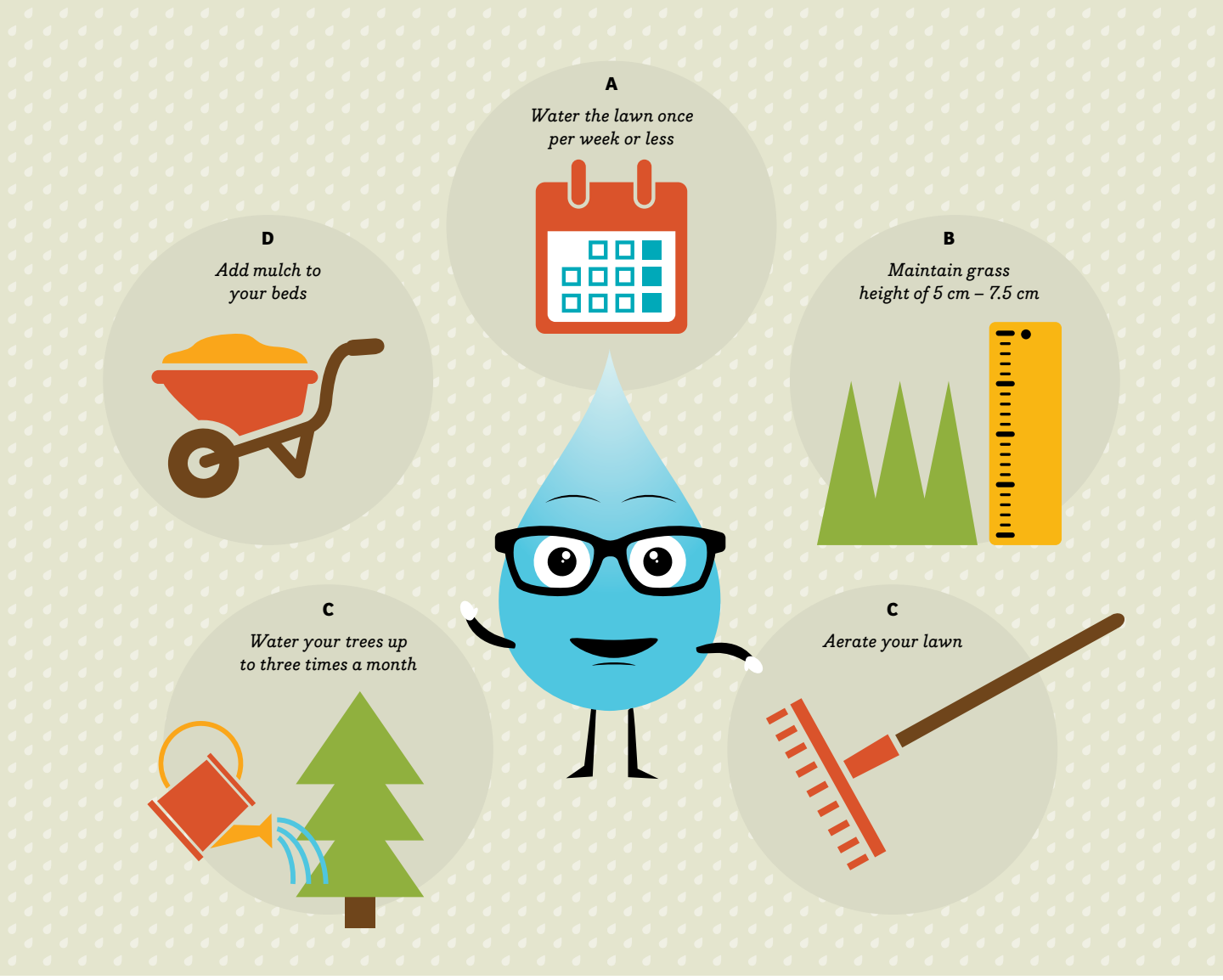
Automatic irrigation systems allow for elevated water efficiency when installed and operated optimally compared to manual watering. In order to ensure Harmony's water system is respected by reducing water consumption, property owners are not to irrigate using any automatic irrigation system which does not incorporate rain and/or soil moisture sensor technology and/or weather data technology. These irrigation devices (and any accessories) must be in working order and must meet the specifications contained in Appendices C and D.

WATERING – BEST PRACTICES

Lawns usually only need to be watered once a week in July and August, and can be watered once a month or less in the cooler spring and fall months. In the summer, one inch of water a week is sufficient in most cases to promote healthy growth. A simple test for determining if grass needs water is to walk on the lawn and if footprints are left behind, it may be time to water the lawn. In addition, using a spade or gardening tool to check soil conditions 50–150mm below the surface can provide information on soil moisture and the need to water.

Watering slowly avoids run-off and ensures the soil absorbs the water. Watering deeply and less often promotes deep root growth and leads to healthier plants. In fact, over-watering can turn your lawn yellow and encourage the development of fungus and diseases. Here are some tips for watering efficiently:

a. Water the lawn once a week (or less when it rains). Put a pie plate or equivalent size container under the sprinkler and water the lawn until the plate or container is full. Time it to know how long to water next time. If you see water pools on the lawn before the time is full, take a break and continue watering in an hour.
b. Maintain grass to a height of 5 cm to 7.5 cm to slow evaporation from the soil, and shade roots.
c. Aerate the lawn in early spring and fall to improve water penetration to the roots.
d. Water trees up to three times a month to keep them healthy when conditions are hot (deep irrigation is optimal). An established, well-selected, tree should require little or no watering in normal weather conditions.
e. Add mulch to flower beds, vegetable gardens and shrub beds to prevent water loss.



Indoor Water Demand Management

Harmony's water system has been designed to be efficient and effective. One key element of this is the implementation of low flow water fixtures. **Property owners must ensure Low Flow Water Fixtures are installed and maintained** during new construction and any renovations. They must not install any water fixtures on the lot or within any building unless fixtures meet the specifications of low flow water fixtures as provided in the Alberta Building Code and as outlined below:

- toilets, do not exceed 6 litres per flush;
- urinals, do not exceed 3.8 litres per flush for manually flushing units;
- showerheads, do not have an output of more than 9.5 litres per minute;
- lavatory basin and kitchen sink faucets, do not have an output of more than 8.3 litres per minute; and
- public restroom faucets, do not have an output of more than 1.9 litres per minute.

WATER QUALITY

Lake

Harmony Lake serves as a water supply storage reservoir, recreational amenity and stormwater management facility. **Preservation of water quality is necessary to reduce treatment demand and protect the lake as a RECREATIONAL amenity.** Due to the exposure to potential contamination, limitations and restrictions are imperative to maintaining lake health. This will ensure the well-being of the natural environment, infrastructure and overall community.

The following limitations have been implemented to support lake water quality:

- Non-native plant and animal species, such as fish, shall not be released into the lake to support the intended and established ecosystem;
- Biological additives and aquatic plant management shall be conducted by those responsible for system maintenance and only include approved products;
- Landscape adjacent to the lake should be carefully maintained to prevent landscape materials from migrating into the lake;
- All natural debris and litter, such as grass, leaves, trash etc. adjacent to the lake should be removed and disposed to prevent entry into the lake;
- Drip irrigation should be utilized for landscaped areas around the lake shoreline;
- Irrigation heads should not be located outside of the boundaries of the property;
- Waterfowl shall not be fed;
- No excavation or land alterations shall occur on lakeside properties, unless authorized by HAWSCO or the developer.

Systems Upstream of Lake

Stormwater systems upstream from Harmony Lake collect and convey water generally through naturalized channels to help remove pollutants, promote evapotranspiration, and provide habitat for a variety of insects, plants, and wildlife prior to entering the lake. It is critical that upstream systems and activities that impact these systems be managed and respected in order to protect the quality of water throughout the entire system. To ensure upstream systems are protected and water quality is managed proactively, property owners must:

- not apply any pesticides or additives (including nutrients and fertilizers) to the lot except in accordance with the product manufacturer's directions, and in the case of chemical treatments, not apply chemical treatments unless applied by a qualified and licensed person;

- not allow private drainage systems (including downspouts, foundation drainage, etc.) to be directly connected to the community drainage system. All private drainage systems must discharge to the ground surface within the confines of the private lot;

- not dispose of any hazardous materials (including, without limitation, solvents, paints, household chemicals, pesticides, soaps, detergents, pharmaceuticals and personal care products) except in a proper manner so as to ensure the same do not enter any segment of the water system;

- not harvest or **remove plants or turf from any swale, naturalized channel, pond, and/or constructed wetland.** Only those responsible for system maintenance are able to alter plants or turf within these areas;

- no component of the stormwater system is to be used for the disposal of trash, yard waste, animal feces, or household chemicals;

- ensure the prescribed ratio of turf in private yards (refer to page 8) so as to reduce overall water usage and total runoff thereby decreasing interaction with contaminants downstream. This ratio shall not be exceeded;

- ensure commercial, institutional, and village core properties (for which on-lot stormwater controls are required) are properly operated and maintained.

Measures to reduce spilling of hazardous materials in public areas, including vehicular discharges from heavy use and traffic accidents, should be implemented. Increased frequency of street cleaning, limited application of road salts and encouragement of alternate forms of de-icing will reduce the chemical and physical contaminants carried by overland drainage into stormwater management facilities and ultimately contribute towards improved water quality downstream.

Cross Connection Control

In order to prevent contamination risks associated with back flow of non-potable water into the potable water system it is imperative that a backflow prevention device for each water outlet is installed at the time of building, in accordance with the building code, and is maintained. In addition, property owners are responsible to ensure no cross connections occur in the future. In the case that future building improvements occur, property owners are to **ensure that improvements are also equipped with a backflow prevention device for each water outlet. Backflow prevention devices are to be in accordance with the current National Plumbing Code of Canada. See Appendix E: "National Backflow Code Requirement".**

Washing Your Vehicle

Water that enters stormwater conveyance systems will eventually make its way to Harmony Lake—the primary drinking source for Harmony. When a vehicle is washed the soap, grease, and dirt are released. **Ultimately, vehicle washing within Harmony will only be permitted at car wash facilities and vehicles will not be permitted to be washed or rinsed on a lot.**

WATER METERING

Water meters help track water consumption and are recognized as an effective water conservation tool. In Harmony, **all residential and non-residential lots will be required to have an effective water meter.**

PROCESS FOR METERING

Meters are to be installed by homebuilders during initial construction. For further information on requirements, processes and specifications related to water meters, refer to Appendix F: “Harmony Water Meter Advanced Connection Process”.

STANDARD DETAILS AND SPECIFICATIONS

All water delivered to each lot is to be metered. All water meters are the property of HAWSCO who is responsible for reading and operation and maintenance of the water distribution system. **Property owners are required to provide access at all times so that HAWSCO can complete the necessary reading and operations and maintenance.** Meters are generally read via a radio system so that access to private property is infrequent.

Property owners shall not use any water fixtures on the lot unless the water meter is in good working order. Nor shall they use any water fixtures on the lot if any water piping has been installed upstream or downstream of the water meter that impacts the accuracy of its functionality.

All meters are to be installed in accordance with the specifications in Appendix F.1 and Appendix F.2 and any supplementary Rocky View County standards. Meters are to meet the sizing requirements of the American Water Works Association Manual of Practice M22 Sizing Water Service Lines and Meters.

SANITARY SEWER SOURCE CONTROL

Property owners must not allow any discharges from their property to the sanitary sewer system unless any discharges comply with the municipality's sewage bylaw, as may be amended from time to time (currently Rocky View County Sewage Bylaw C5083-99). The release of unauthorized discharges can significantly impact the performance of the collection system and treatment plant.

All property owners must also ensure that inflow and infiltration into the sanitary sewer system from either stormwater or groundwater sources are minimized, since these waters occupy capacity within the sewers and can result in sewer backups and associated property damage. **Specifically, no roof leader, foundation drain, lawn basin or perforated drain shall be connected to the sanitary sewer system. Any damaged sewer service connection piping must be repaired to prevent inflow into the sanitary sewer.**

WATER RESTRICTIONS

One of the purposes of water restrictions is to manage demand for potable water and raw water for residential irrigation during times of emergency and, if necessary, during the summer months. This is important because:

- rainfall is lowest and demand is highest in the summer;
- storage, transmission and distribution system capacities are sized properly, but can be limited at times of heavy use;
- water shortages may result from unforeseen emergency situations (e.g. floods, major service disruptions, etc.).

The Harmony golf course uses reclaimed water released from the Harmony wastewater treatment plant for irrigation purposes, while potable or raw water is the source for residential irrigation systems. **The Harmony Water Management Plan restrictions apply to the use of potable and raw water systems.** If persistent drought conditions occur, the Harmony Water Management Plan prescribes actions that will produce significant reductions in daily water demand for both raw and potable water supplies within Harmony.

The Harmony Water Management Plan uses a staged approach, ranging from an initial standard level of water restrictions, combined with timely and effective public notification, through to the highest level of restrictions intended for emergencies affecting the delivery of water. The water restrictions are to be implemented by the operators of HAWSCO, when deemed necessary at the discretion of HAWSCO. Property owners shall not use water in breach of any restrictions on water use as set forth in any notice given by HAWSCO from time to time with notice given personally to the owner of the lot or through general public notification.

General guidelines are used to assess water storage and determine which water restrictions are appropriate. That being said, water supply systems are complex and deficiencies cannot always be measured by single inputs. As such, HAWSCO has the right to enact any water use restrictions at any time.

STAGE 1 WATER USE RESTRICTIONS

Stage 1 Water Use Restrictions will generally be activated in the summer months; however, activation at any time is at the discretion of HAWSCO:

- HAWSCO will suspend hydrant flushing except for unscheduled safety or public health reasons; routine system flushing will be scheduled outside of the summer time-frame.

- Lawn sprinkling will be restricted to three periods a week, mornings only, enforced by HAWSCO. Outdoor sprinkling of lawns using hose-connected or automatic irrigation systems will be permitted only as follows:

  a. **Residential Addresses:**
     1. Even-numbered addresses:
        Monday, Wednesday and Saturday mornings
        (12:00–6:00 am)
     2. Odd-numbered addresses:
        Tuesday, Thursday and Sunday mornings
        (12:00–6:00 am)

  b. **Non-residential Addresses:**
     1. Even-numbered addresses:
        Monday and Wednesday mornings
        (12:00–6:00 am)
     2. Odd-numbered addresses:
        Tuesday and Thursday mornings
        (12:00–6:00 am)
     3. All non-residential addresses:
        Friday mornings (12:00–6:00 am)

  c. **Exemptions:**
     1. Newly-planted lawns will be allowed to be watered outside of restricted times, but owners will be required to obtain a permit that must be displayed on the lawn. See Appendix H for a copy of the permit application form.
     2. Appropriate watering of flower and vegetable gardens, decorative planters, shrubs and trees will be allowed.
     3. Filling of pools, spas, and fountains will be allowed.

STAGE 2 WATER USE RESTRICTIONS

HAWSCO has the discretion to enact or delay Stage 2 Water Use Restrictions under different conditions if deemed necessary.

Under Stage 2 Water Use Restrictions, lawn sprinkling will be restricted to one morning a week only, enforced by HAWSCO. Outdoor sprinkling of lawns using hose-connected or automatic irrigation will be permitted only as follows:

a. **Residential Addresses:**
   1. Even-numbered addresses:
      Wednesday morning only (12:00–6:00 am)
   2. Odd-numbered addresses:
      Thursday morning only (12:00–6:00 am)

b. **Non-residential Addresses:**
   1. Even-numbered addresses:
      Monday morning only (12:00–6:00 am)
   2. Odd-numbered addresses :
      Tuesday mornings only (12:00–6:00 am)

c. Hosing of outdoor surfaces (e.g. driveways, sidewalks, walls, roofs) will not be allowed unless required to avoid public health and safety concerns or to prepare a surface for painting, sealing or similar treatment, and must be done using a spring-loaded shutoff nozzle.

d. Pressure washing is equivalent to hosing of an outdoor surface, and will not be permitted except to prepare a surface for painting, sealing or similar treatment. Pressure washing for the purpose of aesthetic cleaning will not be permitted. This will apply to both private and commercial pressure washing.

e. **Exemptions:**
   - Newly-planted lawns will be allowed to be watered outside of restricted times, but will be required to obtain a permit to be displayed on the lawn. See Appendix H for a copy of the permit application form.
   - Appropriate watering of flower and vegetable gardens, decorative planters, shrubs, trees and turf at commercial turf farms will be allowed.

STAGE 3 WATER USE RESTRICTIONS

HAWSCO has the discretion to enact or delay this stage under any condition as deemed necessary.

Under Stage 3 Water Use Restrictions:

- All forms of lawn watering using potable water or raw water will be banned completely. New lawns, ornamental lawns belonging to Harmony community buildings, and grassed boulevards will not be exempt.

- Watering of shrubs, trees, flowers, vegetable gardens and decorative planters will not be permitted unless done by hand using a spring-loaded shutoff nozzle, containers or drip irrigation systems. Watering using sprinklers or soaker hoses is prohibited.

- Pressure washing is equivalent to hosing of an outdoor surface. Only commercial pressure washing to prepare a surface for painting, sealing or similar treatment will be permitted. Pressure washing for the purpose of aesthetic cleaning will not be permitted. Private pressure washing will be prohibited.

- Filling or refilling of garden ponds, hot tubs, or swimming pools will be prohibited.

- Exemptions: Hosing of outdoor surfaces (e.g. driveways, sidewalks, walls, roofs) will be permitted only if required to avoid public health and safety concerns or to prepare a surface for painting, sealing or similar treatment.

STAGE 4 EMERGENCY WATER USE RESTRICTIONS

The measures listed in this stage are intended for cases of EMERGENCY water shortages. HAWSCO has the discretion to enact or delay this stage under any condition as deemed necessary.

This stage remains in effect until the emergency water shortage has passed, or as deemed appropriate by HAWSCO. Under Stage 4 Water Use Restrictions, restrictions are the same as Stage 3 except:

- Any form of watering (even if done by hand, containers, soaker hoses or drip irrigation) using potable water will be prohibited for:

  a. Commercial flower gardens
  b. Residential flower gardens
  c. Residential vegetable gardens
  d. Planters
  e. Trees and shrubs
  f. New lawns
  g. Grassed boulevards

- HAWSCO permits for watering new lawns will be discontinued.

- Commercial or private pressure washing and hosing of any outdoor surfaces will not be allowed unless ordered by a regulatory authority (e.g. WCB, public health inspectors) for health and safety reasons.

COMMUNICATION OF WATER USE RESTRICTIONS

Public communications and notices by HAWSCO regarding water use restrictions will be increased with each successive stage of the water restrictions. Outdoor and indoor water use efficiency information and resource materials will be produced and distributed by HAWSCO for the Harmony community. This information will be in the most appropriate format(s) and media. In the case of a water restriction, notice will be delivered to the follow parties:

- Owners Association of Harmony
- Harmony golf course
- The developer
- Commercial centers

ENFORCEMENT OF WATER RESTRICTIONS

Water restrictions will be enforced and should these restrictions be violated the following methods of enforcement may be used:

- issue of written warning
- issue of fine
- issue of a secondary fine
- limitation of water supply

EMERGENCY RESPONSE PROCEDURES

A complete Emergency Response Procedure (ERP) for the Harmony Water Treatment Plant is located in Appendix I and the ERP for the Harmony Wastewater Treatment Plant is located in Appendix J. The ERPs contain information regarding procedures for HAWSCO to safely and effectively respond to incidents that threaten public health, safety and welfare, or HAWSCO's operations.

APPENDICES

APPENDIX A:

Compatible Plant Material – Harmony Residential Lots

Compatible Plant Material - Harmony Residential Lots

Trees

	Common Name	Latin Name
	American Elm	Ulmus americana
	Amur Cherry	Prunus maackii
d	Assiniboine Poplar	Populus x 'Assiniboine'
	Balsam Poplar	Populus balsamifera
n	Balsam Poplar	Populus balsamifera
n/d	Baron Manitoba Maple	Acer negundo 'Baron'
n	Brandon Elm	Ulmus americana 'Brandon'
	Brooks #6 Poplar	Populus x 'Brooks #6'
n	Bur Oak	Quercus macropcarpa
d	Byland Green Poplar	Populus x 'Byland Green'
	Carmine Jewel Cherry	Prunus x 'Sk Carmine Jewel'
d	Colorado Spruce	Picea pungens
n	Douglas Fir	Pseudotsuga menziesii
	Evans Cherry	Prunus cerasus 'Evans'
n/d	Foothills Green Ash	Fraxinus pennsylvanica 'Heuver'
n?	Fountain Birch (Red Birch)	Betula occidentalis fontinalis
	Gold Rush Amur Cherry	Prunus maackii 'Jefree'
n	Hawthorne	Crataegus chrysocarpa
d	Hoopsii Spruce	Picea pungens 'Hoopsii'
	Ivory Silk Tree Lilac	Syringa reticulata 'Ivory Silk'
n	Limber Pine	Pinus flexilis
	Littleleaf Linden	Tilia cordata
n/d	Lodgepole Pine	Pinus contorta 'Latifolia'
n/d	Manitoba Maple	Acer negundo
	Mary Liss Pincherry	Prunus pennsylvanica 'Mary Liss'
	Mayday	Prunus padus 'Commutata'
n	Midnight Schubert Chokecherry	Prunus virginiana 'Midnight'
	Mongolian Strain Scots Pine	Pinus sylvestris mongolica
	Mountain Ash various	Sorbus various
h	Ohio Buckeye	Aesculus glabra
n	Paper Birch	Betula papyrifera
n	Paskapoo Poplar	Populus balsamifera 'Paskapoo'
n/d	Patmore Green Ash	Fraxinus pennsylvanica 'Patmore'
n	Pincherry	Prunus pensylvanica
	Pincherry	Prunus pennsylvanica

	Common Name	Latin Name
	Pink Spire(s) Crabapple	Mauls x 'Pink Spire'
d	Ponderosa Pine	Pinus ponderosa
d	Prairie Sky Poplar	Populus x canadensis 'Prairie Sky'
n/d	Prairie Spire Green Ash	Fraxinus pennsylvanica 'Rugby'
n	Princess Kay Plum	Prunus nigra 'Princess Kay'
	River Alder	Alnus Tenuifolia
	Round Leaf Hawthorne	Crataegus chrysocarpa rotundifolia
	Russian Hawthorne	Crataegus ambigua
n/d	Sargent's Poplar	Populus sargentii
n	Schubert Chokecherry	Prunus virginiana 'Schubert'
n	Showy Mountain Ash	Sorbus decora
d	Siberian Larch	Larix sibirica
n	Silver Maple	Acer saccharinum
	Snowbird Hawthorn	Crataegus mordenensis 'Snowbird'
d	Sutherland Caragana	Caragana arborescens 'Sutherland'
d	Swedish Columnar Aspen	Populus tremula 'Erecta'
n	Tamarack/Larch	Larix laricina
	Tatarian Maple	Acer tataricum
	Toba Hawthorn	Crataegus mordenensis 'Toba'
d	Tower Poplar	Populus x canescens 'Tower'
n/d	Trembling Aspen	Populus tremuloides
d	Tristis Poplar	Populus x 'Tristis'
n	Tuxedo White Ash	Fraxinus americana 'Durgar'
	Ussurian Pear	Pyrus ussuriensis
n	Western Chokecherry (tree/shrub)	Prunus virginiana 'Melanocarpa'
	Western Cottonwood	Populus deltoides
	Western Mountain Ash	Sorbus scopulina
n	White Spruce	Picea glauca

n = native/naturalized species*

d = drought tolerant*

* Applicable once plant material is established.

Compatible Plant Material - Harmony Residential Lots

Shrubs

	Common Name	Latin Name
d	Alpine Currant	Ribes alpinum
n	Autumn Magic Chokeberry	Aronia melanocarpa 'Autumn Magic'
n/d	Bebb's Beaked Willow	Salix bebbiana
	Birch Leaf Meadowsweet	Spiraea betulifolia
d	Blue Fox Willow	Salix brachycarpa 'Blue Fox'
	Blue Fox Willow	Salix integra 'Blue Fox'
	Bracted Honeysuckle	Lonicera involucrata
n	Buckbrush Coralberry	Symphoricarpos occidentalis
d	Common Caragana	Caragana arborescens
n/d	Common Effusa Juniper	Juniperus communis 'Effusa'
n	Common Juniper	Juniperus communis
	Common Ninebark	Physocarpus opulifolius
	Compact Cranberry	Viburnum trilobum 'Compactum'
d	Cotoneaster	Contoneaster acuifolia
n	Coyote Willow	Salix exigua
n	Creeping Juniper various	Juniperus horizontalis
	Creeping Mahonia	Mahonia repens
	Dart's Gold Ninebark	Physocarpus opulifolius 'Dart's Gold'
n	Dewberry	Rubus pubescens
	Diabolo Ninebark	Physocarpus opulifolius 'Monlo'
	Dogwood various	Cornus various
	Double Flowering Plum	Prunus triloba 'Multiplex'
	Dwarf Birch	Betula glandulosa
	Dwarf Mugo Pine	Pinus mugo 'Pumilio'
d	Fernleaf Caragana	Caragana arborescens 'Lorbergii'
	Goldcoast Juniper	Juniperus chinensis 'Goldcoast'
n/d	Golden Flowering Currant	Ribes aureum
n/d	Gooseberry	Ribes hirtellum
n	Gooseberry	Ribes oxyacanthoides
	Green Alder	Alnus crispa
n	Highbush Cranberry	Viburnum trilobum
d	Honeyberries	Lonicera caerulea var. edulis sp.
d	Honeyberries	Lonicera caerulea var. edulis sp.

	Common Name	Latin Name
	Labrador Tea	Ledum groenlandicum
d	Lemonade Sumac	Rhus trilobata
	Lilac various	Syringa
n	Lingonberry	Vaccinium vitis-idaea
	Lowbush Cranberry	Viburnum edule
	Mockorange	Philadelphus lewisii
	Mugo Pine	Pinus mugo mugo
	Nanking Cherry	Prunus tomentosa
d	Polar Bear Willow	Salix salicola 'Polar Bear'
d	Potentilla various	Potentilla
n	Prairie Rose	Rosa arkansana
n	Prickly Rose	Rosa acicularis
d	Pygmy Caragana	Caragana pygmaea
	Raspberry	Rubus ideaus
	Red Berried Elder	Sambucus racemosa
	Rocky Mountain Juniper	Juniperus scopulorum
n	Russet Buffaloberry	Shpherdia canadensis
n	Sagebrush	Artemisia cana
n	Saskatoon	Amelanchier alnifolia
	Savin Juniper	Juniperus sabina
n/d	Sea Buckthorn	Hippophae rhamnoides
d	Siberian Salt Bush	Halimodendron halodendron
n/d	Silver Buffalowberry	Shepherdia argentea
	Snowball Cranberry	Viburnum opulus 'Roseum'
n	Snowberry	Symphoricarpos albus
	Spirea various	Spiraea
	Sweetberry Honeysuckle	Lonicera caerulea
	Thimbleberry	Rubus parviflorus
	Waterton Mockorange	Philadelphus lewisii 'Wateron'
	Western Sandcherry	Prunus besseyi
n	Woods Rose	Rosa woodsii

n = native/naturalized species*

d = drought tolerant*

* Applicable once plant material is established.

Compatible Plant Material - Harmony Residential Lots

Grasses

	Common Name	Latin Name
n/d	Big Blue Stem Grass	Andropogon gerardii
d	Blue Lyme Grass	Elymus arenarius
d	Blue Fescue	Festuca ovina glauca
d	Elijah Blue Fescue	Festuca ovina glauca 'Elijah Blue'
d	Blue Oat Grass	Helictotrichon sempervirens
n/d	June Grass	Koeleria crista
n/d	Little Blue Stem Grass	Schizachyrium scoparium
	Avalanche Variegated Reed Grass	Calamagrostis acutifolia 'Avalanche'
	Feather Reed Grass	Calamagrostis x acutiflora 'Karl Foerster'
	Overdam Variegated Feather Reed	Calamagrostis acutiflora 'Overdam'
	Ravenna Grass	Erianthus ravennae
	Prairie Sky Switch Grass	Panicum virgatum 'Prairie Sky'
d	Ivory Tower Yucca	Yucca filamentosa 'Ivory Tower'

Perennials

	Common Name	Latin Name
	Aster various	Aster
	Bee Balm various	Monarda
d	Blanket Flower various	Gaillardia
d	Blue Clips Bellflower	Campanula carpatica 'Blue Clips'
n	Bunchberry	Cornus canadensis
d	Champagne Bubble's Iceland Poppy	Papaver nudicaule 'Champagne Bubbles'
d	Creeping Red Thyme	Thymus praecox 'Coccineus'
d	Cushion Spurge	Euphorbia polychroma
d	Daylily various	Hemerocallis
n/d	Double Decker Coneflower	Echinacea purpurea 'Double Decker'
d	Dwarf Purple Gayfeather	
d	English Lavender	Lavandula anfustifoli 'Munstead'
n	Evening Primrose	Oenothera missouriensis
n/d	Evergreen Candytuft	Iberis sempervirens
d	Green Envy Coneflower	Echinacea purpurea 'Green Envy'
d	Hens and Chicks various	Sempervivum
	Hosta various	Hosta
	Iris various	Iris
n/d	Kinnikinnick / Bearberry	Arctostaphylos uva-ursi
	Lily various	Lilium
n/d	Magnus Coneflower	Echinacea purpurea 'Magnus'
	Mum various	Chrysanthemum
n	Native Bee Balm	Monarda fistulosa
n	Native Ostrich Fern	Matteuccia struthiopteris
n	Pearly Everlasting	Anaphalis margaritacea 'New Snow'
	Peony various	Paeonia
d	Persian Cornflower	Centaurea dealbata 'Rosea'
n/d	Prairie Crocus	Anemone pulsatilla 'Vulgaris'
n/d	Pussy Toes	Antennaria dioica 'Rosea'
d	Russian Sage	Perovskia atriplicifolia
	Sage	Artemisia cana
n	Silver Mound	Artemisia schmidtiana
d	Stonecrop various	Sedum
d	Wonderland Iceland Poppy	Papaver nudicaule 'Wonderland'
d	Yarrow various	Achillea

Vines

Common Name	Latin Name
Western White Clematis	Clematis lingusticifolia
Purple Clematis	Clematis occidentailis
Dropmore Honeysuckle	Lonicera bella

n = native/naturalized species*

d = drought tolerant*

* Applicable once plant material is established.

Compatible Plant Material - Harmony Residential Lots

Bioswale

	Common Name	Latin Name
	Blue Clips Bellflower	Campanula carpatica 'Blue Clips'
n	Brandon Elm	Ulmus americana 'Brandon'
	Cattail	Typha latifolia
	Creeping Jenny various	Lysimachia nummularia
	Cutleaf Weeping Birch	Betula pendula 'Laciniata'
	Dogwood various	Cornus
	Dwarf Birch	Betula glandulosa
	False Spirea various	Astilbe
	Golden Queen Globeflower	Trollius chinensis 'Golden Queen'
	Golden Willow	Salix alba 'Vitellina'
n	Green Ash various	Fraxinus
	Juniper various	Juniperus
	Laurel Leaf Willow	Salix pentandra
	Ligularia various	Ligularia
	Mugo Pine	Pinus
n	Paper Birch	Betula papyrifera
	Pink Turtlehead	Chelone obliqua
	Potentilla various	Potentilla
	Ribbon Grass	Phalaris arundinacea var. picta
n	Sharpleaf Willow	Salix acutifolia
	Sweet Variegated Iris	Iris pallida 'Albo Variegata'
	Variegated Moor Grass	Molinia caerulea 'Variegata'
	White Clips Bellflower	Campanula carpatica 'White Clips'
	Willow various	Salix

Wetland

	Common Name	Latin Name
	Alkali Buttercup	Ranunculus cymbalaria
n	Arrow Grass	Triglochin maritima
	Baltic Rush	Juncus balticus
n	Bog Arum	Calla palustris
	Bottel Brush Sedge	Carex comosa
n	Cattail	Typha latifolia
n	Common Duckweed	Lemna turionifera
	Common Great Bulrush	Scirpus validus
	Creeping Spike Rush	Eleocharis palustris
n	Floating Marsh Marigold	Caltha natans
n	Floating-leaf Pondweed	Potamogeton natans
n	Giant Bur-reed	Sparganium eurycarpum
	Golden Sedge	Carex aurea
n	Hardstem Bulrush	Scirpus acutus
	Hornwort	Certatophyllum demersum
	Horsetail Rush	Equisetum hyemale
n	Ivy-leaved Duckweed	Lemna trisulca
n	Knotted Rush	Juncus nodusus
n	Marsh Cinquefoil	Potentilla palustris
n	Marsh Marigold	Caltha palustris
n	Narrow-leaved Cotton Grass	Eriophorum angustifolium
n	Northern Water Milfoil	Myriophyllum aquaticum
n	Slough grass	Beckmannia syzigachne
n	Small-fruited Bulrush	Scirpus microcarpus
	Soft Stem Bullrush	Scirpus tabernaemontani
n	Sweet Flag	Acorus americanus
n	Water Sedge	Carex aquatilis
n	Water Smartweed	Polygonum amphibium
n	White Water Crowfoot	Ranunculus aquatilis

n = native/naturalized species*

d = drought tolerant*

* Applicable once plant material is established.

APPENDIX B:

Harmony – Residential Lot Irrigation

November 5, 2012 File: 2569.0023.41

Harmony Developments Inc.
101, 6420-6A St. SE
Calgary AB T2H 2B7

Attention: Birol Fisekci, President & CEO

RE: HARMONY – RESIDENTIAL LOT IRRIGATION

As a precursor to the Irrigation Master Plan document / report, it is important to understand the overall water balance as it relates to residential lot irrigation for the project. Based on our overall water availability, we have examined a number of options related to the layout of irrigated landscape area for individual lots. Subsequently, a preferred scenario has been selected that we feel is appropriate for this community and respects the guiding principles that have been set forth for the Harmony project.

Design Input

In order to analyze specific options for residential lot landscape and irrigation design, we must first look at the larger scale components at work that will define our boundaries. The water availability for Harmony (as outlined in the Integrated Water Systems Master Plan) is as follows:

Supply	
Lake inflow (990 Megalitres (ML)/year) less losses (450 ML/year)	540 ML/year
Water license	2,100 ML/year
Total Supply	**2,640 ML/year**
Demands	
Indoor water needs	960 ML/year
Commercial toilet flushing	215 ML/year
Total Demands	**1,175 ML/year**
Total available for all irrigation	**1,465 ML/year**

Design Scenarios

With the above numbers in mind, we looked at four different scenarios for residential lot landscape design and associated irrigation requirements. The scenarios are based on the percentage of irrigated landscape as it relates to total lot area as well as the landscape coefficient which addresses the ratios of different plant materials based on specific irrigation requirements. There are three different landscape coefficients examined within these scenarios. They are as follows:

(1) .525 – equivalent to 50% turf grass, 50% hardy ornamental trees and shrubs
(2) .595 – equivalent to 70% turf grass, 30% hardy ornamental trees and shrubs
(3) .700 – equivalent to 100% turf grass

Turf grass is the highest water-use landscape type. The percentage of turf grass associated with each landscape coefficient above is a maximum value. Within each scenario, the turf grass percentage can be lower and subsequently, the ornamental species area proportionately higher based on total lot area.

The scenarios below incorporate the above landscape coefficients and examine a range of different landscape types and coverage from an irrigation water usage and landscape design perspective. Within the context of these scenarios, only turf grass will be irrigated with spray heads and/or rotors. All trees, shrubs, and perennials shall be watered utilizing drip irrigation.

Scenario	**#1**	**#2**	**#3**	**#4**
Irrigated landscape coverage (% of total lot)	30%	60%	60%	45%
Landscape coefficient	.525	.525	.70	.595
Lot release 1 & 2 residential (ML/year)	48.7	97.4	129.9	82.8
Remaining residential (ML/year)	192.3	384.6	512.7	369.4
Other (ML/year)	374.6	374.6	374.6	374.6
Total (ML/year)	**615.6**	**856.6**	**1,017.2**	**826.8**

Keep in mind that the above scenarios address irrigated landscape area only. In addition to these zones, the residential lot owner may choose to have areas of native plant species that do not require irrigation and therefore would not count against the overall water availability.

The current sizing of the pump station at the water treatment facility is also an important factor in determining the most appropriate residential lot irrigation scenario for Harmony. A summary of the current pump specifications and flow requirements for each scenario are outlined below.

Installed total pump station maximum flow – 405 l/s (litres per second)
Installed largest pump maximum flow – 265 l/s
Golf course flow requirement – 260 l/s
Supplemental pump flow (Installed total pump station maximum flow less golf course) – 145 l/s

Scenario	**#1**	**#2**	**#3**	**#4**
Peak flow pump requirement	239 l/s	333 l/s	395 l/s	322 l/s
Total irrigated area serviced before removal of golf course demand is required	60%	44%	37%	45%

In analyzing the above options, we recommend that scenario 4 be selected as the guideline for residential lot landscape development. Aside from being well within our available water supply and falling within our peak demand flow requirements, this scenario will present the homeowner with substantial landscape design flexibility while maintaining a level of responsibility within the framework of sustainable practices that have been set forth for this project. It will also encourage diversity in terms of individual lot landscape design that will contribute to the overall character of the residential neighbourhoods. In an effort to provide clarity in terms of the landscape design, we have provided three exhibits as an attachment to this memorandum that illustrate the properties of scenario #4 as it relates to three different typical lot layouts for the Harmony project. These three exhibits all incorporate the maximum allowable percentage of turf grass (70%) with the remainder of the allowable

45% irrigated area attributed to hardy ornamental trees and shrubs. As mentioned previously, there is a great deal of design flexibility within this scenario. For the purposes of this exercise, we have chosen to focus on designs that would maximize the allowable irrigation-related water usage.

Recommended Use Restrictions

The flexibility associated with the selected scenario does not come without a fair measure of accountability. In order to maintain the intent of this scenario, we would like to present what we feel are necessary irrigation related use restrictions to be executed in conjunction with the summarized design restrictions summarized above in an effort to define boundaries, create a sense of equality, and respect the overall water balance within the community. The following is a proposed outline of four staged water conservation levels with stage 1 being the standard operating practice within the community unless otherwise determined based on drought conditions.

Stage 1

- Odd / even watering days assigned to residents
- 12:00am to 6:00am watering window for automated systems
- Special permit required for operation of system outside of the defined watering window(i.e. turf grass establishment period)
- Hand watering only from hose bib (unattended watering not permitted)

Stage 2

- All Stage 1 requirements apply
- Two watering days a week assigned to residents

Stage 3

- All Stage 1 and 2 requirements apply
- One watering day per week assigned to residents for turf grass only
- No drip irrigation permitted

Stage 4

- No irrigation permitted
- No car washing permitted

Summary

The proposed recommendations outlined above are intended to be a guideline moving forward and may be developed further as the Harmony project evolves. At this point in time with the information that is available to us, we believe that the chosen scenario in combination with integrated design and use restrictions will provide the best long term solution for residential lot irrigation water use without compromising the flexibility and diversity that remains consistent with the Harmony vision of sustainable and low impact development practices.

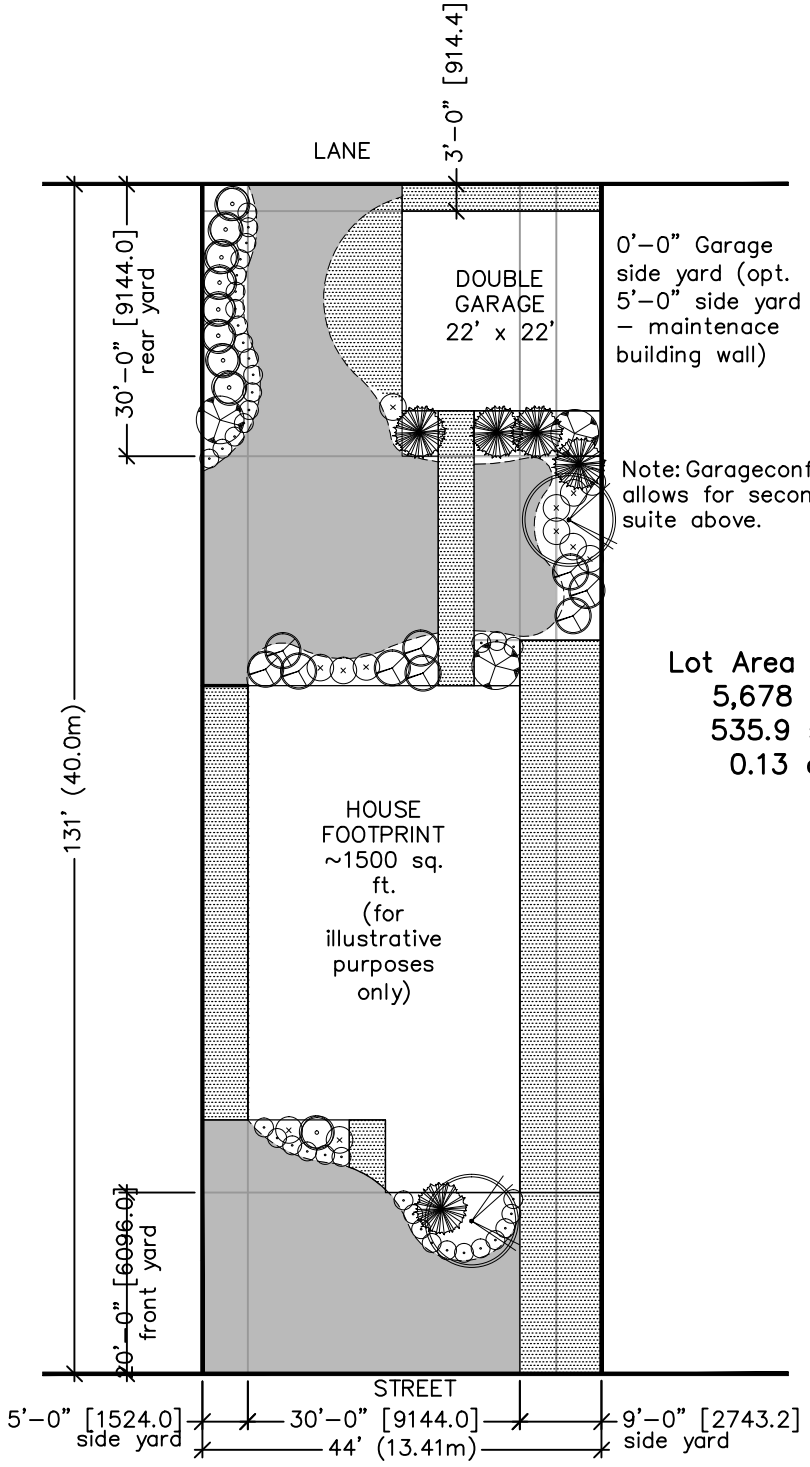
Garage Orientation: Rear Garage

Lot Template A

Stage 1 Development
Single Detach Dwelling
44' (13.4 m) Lot Template

Lot Width: 44'

Building Width: 30'



Lot Area Template
5,678 sq. ft.
535.9 sq. m.
0.13 acres

HARDSCAPE AND/OR DROUGHT TOLERANT LANDSCAPE (NO IRRIGATION REQ'D)

PLANTING BEDS (IRRIGATION REQ'D)
70m², 13% of total lot
30% of irrigated area

TURF (IRRIGATION REQ'D)
166m², 31% of total lot
70% of irrigated area

TOTAL IRRIGATED AREA:
44% OF LOT AREA

Yard Requirement Minimums

	Principle Building	Garage
Front	20'	N/A
Side	5' / 9' > 14'	N/A
Side		back – 0'/5'*
Rear	30'	3'

Principles:

– Rear access lot.
– Garage must be located at back of principle building.

Min. Lot Depth: 131'
Min. Lot Width: 44'
Min Lot Area: _____
Min. House Size: _____
Max. House Size: _____
Max Building Coverage: 35%

* rear yard garage – side yard dependent on exterior maintenance.

Harmony

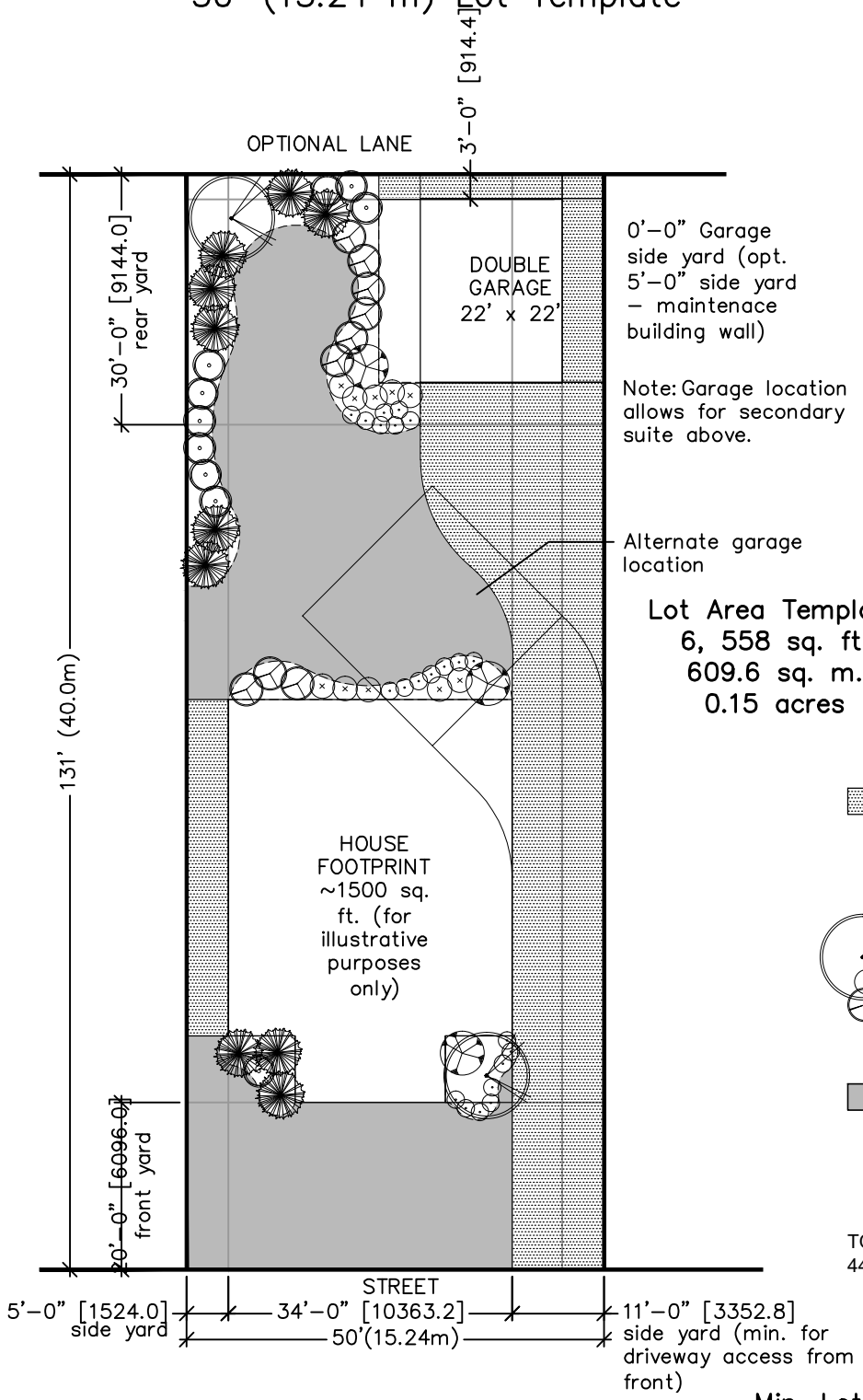
Garage Orientation: Rear Garage

Lot Template B

Stage 1 Development
Single Detach Dwelling
50' (15.24 m) Lot Template

Lot Width: 50'

Building Width: 34'



Lot Area Template
6, 558 sq. ft.
609.6 sq. m.
0.15 acres

HARDSCAPE AND/OR DROUGHT TOLERANT LANDSCAPE (NO IRRIGATION REQ'D)

PLANTING BEDS (IRRIGATION REQ'D)
79m², 13% of total lot
30% of irrigated area

TURF (IRRIGATION REQ'D)
189m², 31% of total lot
70% of irrigated area

TOTAL IRRIGATED AREA:
44% OF LOT AREA

Yard Requirement Minimums

	Principle Building	Garage
Front	20'	N/A
Side	5'	N/A
Side	11' (16')	back – 0'/5'*
Rear	30'	3'

Principles:
– Rear garage lot
– Garage located at reat of principle building.
– Garage access via lane or by "pass by" front driveway.

Min. Lot Depth: 131'
Min. Lot Width: 50'
Min Lot Area: _____
Min. House Size: _____
Max. House Size: _____
Max Building Coverage: 35%

Harmony

* rear yard garage – side yard dependent on exterior maintenance.

Garage Orientation: Front Garage (Flush)

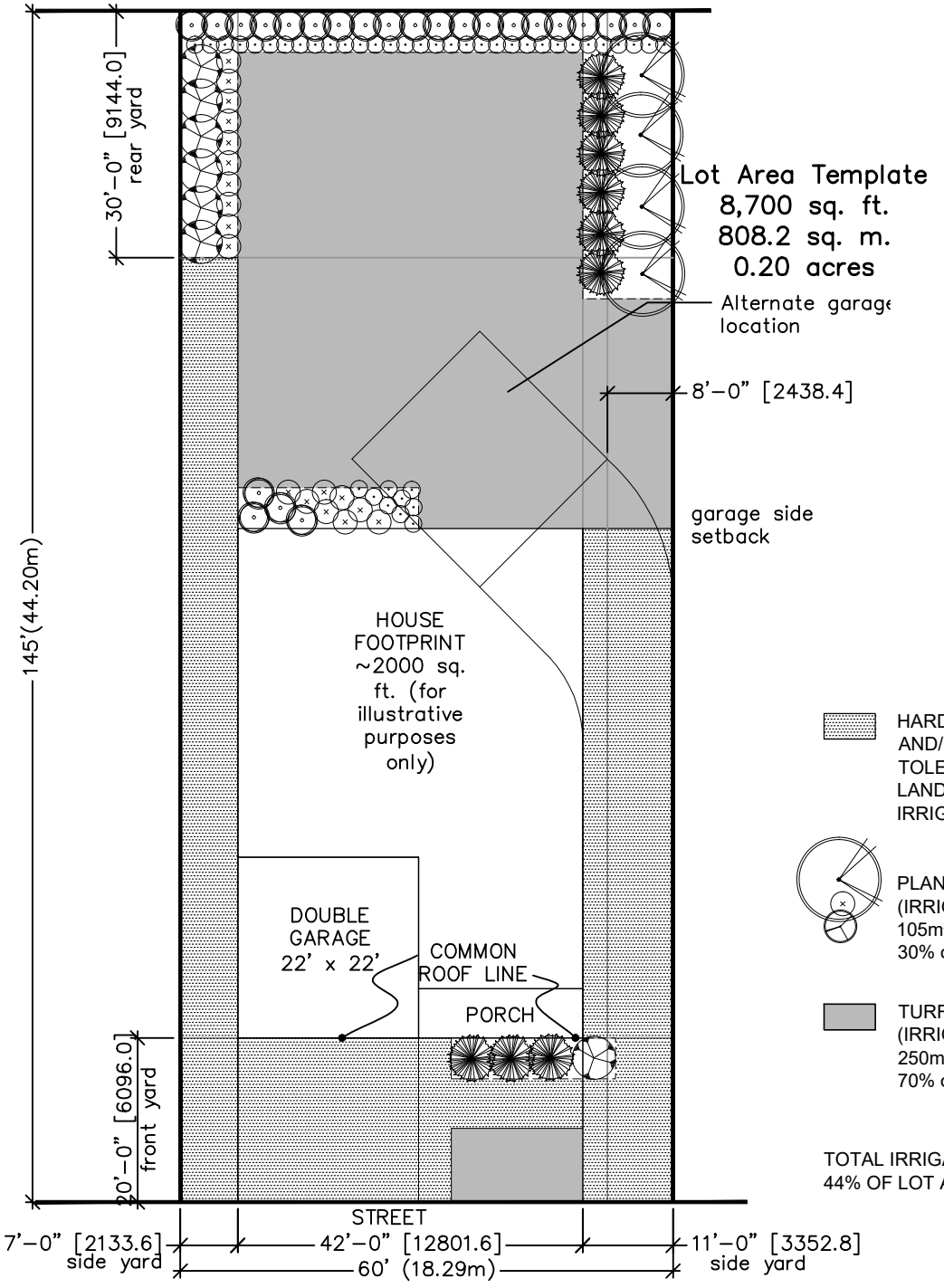
Lot Template C

Stage 1 Development
Single Detach Dwelling
60'/70' (18.3 m/21.3 m) Lot Template

Lot Width: 60/70'

Building Width: 42'

GREENSPACE OR LOTS



Yard Requirement Minimums

	Principle Building	Garage
Front	20'	20'
Side	7' > 18'	8'
Side	11' > 18'	N/A
Rear	30'	30'

Principles:
- Garage located at front of building or possibly to rear.
- Max double car garage allowed at house front if garage is parallel to street.

Min. Lot Depth: N/A
Min. Lot Width: 60'
Min Lot Area: _____
Min. House Size: _____
Max. House Size: _____
Max Building Coverage: 30%

Harmony

APPENDIX C:

Irrigation Installation Specifications – Potable Water

HAWSCO

Irrigation Installation Specifications – Potable Water

GENERAL

1. Scope of Work

Supply and install an automatic irrigation system, designed and installed to meet Irrigation Association and manufacturer's specifications for efficient water application.

2. Quality Assurance

(a) All irrigation work shall be completed by a suitably experienced and qualified irrigation contractor, having trained and competent personnel adequate for the scope of work.

(b) A written warranty of the installed system shall be provided to the owner covering workmanship and materials for a minimum of one (1) year.

3. Backflow Requirement

All irrigation systems (including residential systems) installed within Alberta will be subject to The National Plumbing Code of Canada 2010.
Any outlet used to dispense potable water from the water distribution system to supply an in-ground irrigation system shall be protected against backflow caused by back siphoning with the following:

a) For systems without injection of chemicals:
i. a PVB device installed upstream of the irrigation system shut-off or other control valves and at least 300 mm above the highest point of the irrigation system; or
ii. A DCVA backflow preventer installed upstream of the irrigation system shut-off or other control valves; or
b) For systems with injection of chemicals, an RP backflow preventer installed upstream of the irrigation system shut-off valves.

IRRIGATION SYSTEM DESIGN AND CONSTRUCTION

The irrigation system must apply water to the landscape as efficiently as possible (highest possible Distribution Uniformity) by strictly following Irrigation Association and the manufacturer design specifications for the emission devices being installed. The irrigation design and lateral line layout must take into account any variation in water requirements within the landscape (e.g. different hydro-zones. Shaded landscape must be irrigated separately from landscape exposed to full sun, shrub/planter beds irrigated separately from turf grass wherever possible). This may involve the type of plant material being irrigated, depth of soil, sun exposure conditions, drainage conditions, and any other site condition that will have a significant impact on water requirements.

1. Sprinklers

(a) All sprinklers must be pressure regulated (have a pressure regulating component within the sprinkler) to prevent excessive water waste and maximize system efficiency.

(b) Sprinklers with built in check valves should be used when low head drainage will be a problem to minimize water waste and reduce erosion.

(c) The maximum sprinkler spacing shall be equal to the radius of throw of the nozzle (head to head) with appropriate allowance for wind if applicable.

(d) All sprinklers must be located and adjusted as best as possible to keep the water within the landscaped area and minimize overthrow.

(e) All sprinklers installed on a single lateral zone must have matched precipitation rates (MPR). Rotor sprinkler nozzle selection must take into account both distance of throw and the arc of the sprinkler for MPR.

(f) Sprinkler nozzles must be of the correct size for the area being irrigated. Set screw nozzle adjustment cannot be adjusted down more than 25% of the maximum radius of throw for the nozzle installed.

(g) All pop-up sprinklers shall be connected to the pipe by an adjustable swing joint assembly that is sized to meet the flow requirements of the sprinkler.

(h) All pop-up sprinklers shall be installed flush and level with the finished grade and not higher than any adjoining hard surface from which there must be at least a 2" separation to allow for edging.

(i) All stationary shrub risers shall be installed with two P.V.C. street elbows connected to the side of the lateral line pipe and a Schedule 80 nipple that is long enough to suit the plant material

(j) Drip irrigation may be used where appropriate (non-turf applications) and at the discretion of the installation contractor. Drip irrigation must have appropriate pressure regulation devices and be installed to manufacturer's specifications. In-line drip tubing must be secured to the landscape surface with manufacturer approved (preferably non-metal) drip stakes at a maximum spacing of every 4 feet.

2. Irrigation Piping and Mainline

(a) Install a **DCVA** backflow preventer installed upstream of the irrigation system shut-off or other control valves.

(b) An irrigation master valve, of the appropriate size, must be installed at or near the point of connection.

(c) Irrigation piping should be sized appropriately to support the demands of the system. The velocity of flow of water through the piping should not exceed 5 feet per second.

(d) The irrigation mainline must be sized large enough to allow for deep root watering (minimum of 4") of the complete landscape and within an acceptable watering window (no longer than 6 hours).

(e) Polyethylene pipe (with the exception of HDPE) may not be used for irrigation mainline sizes greater than 1".

3. Irrigation Controller

To meet Harmony's water management strategy and operational requirements,

(a) All controllers must be EPA certified/approved with a rain/freeze sensor installed.
(b) A HAWSCO approved equivalent may also be installed with permission.
(c) An optional HAWSCO managed controller may be installed to achieve maximum water savings.
(d) All irrigation lateral zones are to be wired to operate in a logical sequence.

4. Electric Control Valves

(a) The electric remote control valve shall be a normally closed 24 VAC 50/60 Hz (cycles/sec) solenoid actuated.

(b) The valve body shall be constructed of heavy-duty glass-filled UV-resistant nylon and have stainless steel studs and flange nuts; diaphragm shall be of nylon reinforced EPDM rubber.

(c) The valve shall have both internal and external manual open/close control (internal and external bleed) for manually opening and closing the valve without electrically energizing the solenoid.

(d) The valve shall house a fully-encapsulated, one-piece solenoid. The solenoid shall have a captured plunger with a removable retainer for easy servicing and a leverage handle for easy turning. This 24 VAC 50/60 Hz solenoid shall open with 19.6 VAC minimum at 200 PSI.

(e) The valve construction shall be such as to provide for all internal parts to be removable from the top of the valve without disturbing the valve installation.

5. Irrigation Control Wire

(a) A spare (or tracer) wire must be installed. Wire gauge must be appropriate based on length of wire run and according to manufacturer's recommendations.

(b) All wire must be approved direct bury irrigation control wire.

(c) All wire connections shall have approved direct bury wire connectors (water proof) and assembled according to the manufacturer's recommendations.

(d) No wire smaller than 18 gauge shall be used in any installation. Wire sizing must follow wire manufacturer recommendation for length of wire run.

(e) All wiring shall be protected by being bundled and taped at 10 foot intervals and installed beneath the irrigation piping or in appropriately sized conduit if run independently.

(f) All wire splices must be contained within a valve box or a wire splice box.

(g) Sufficient extra wire shall be left in each valve box such that the splice may be lifted 12" above grade.

(h) White wire shall only be used as the common wire color and wire colors must be consistent from the field valve back to the controller.

5. Road, Walkway, and Hard Surface Crossing

Sleeve all irrigation under all walkways, driveways, and road crossings with SDR 35 PVC at a minimum of twice the diameter of the irrigation pipe. A field wire conduit shall be installed adjacent to the mainline sleeving under all hard surfaces. Water lines and control wire cannot share the same sleeve.

FINAL INSPECTION AND TESTING

(a) Upon completion of the irrigation system installation, sprinklers must be adjusted for correct arcs, distance of throw, sprinkler placement, and sprinkler height to avoid watering hard surfaces.
(b) If operational, the system must be maintained in good working condition.
(c) Inspection may be carried out by a HAWSCO representative to ensure that the work has been completed and meets all of the landscape and irrigation standards set out in the specifications to conform to Harmony's water management strategy.

APPENDIX D:

Irrigation Installation Specifications - Raw Water

HAWSCO

Irrigation Installation Specifications – Raw Water

GENERAL

1. Scope of Work

Supply and install an automatic irrigation system, designed and installed to meet Irrigation Association and manufacturer's specifications for efficient water application.

2. Quality Assurance

(a) All irrigation work shall be completed by a suitably experienced and qualified irrigation contractor, having trained and competent personnel adequate for the scope of work.

(b) A written warranty of the installed system shall be provided to the owner covering workmanship and materials for a minimum of one (1) year.

3. Submittals

(a) A suitably scaled As-Built Drawing of the Irrigation System shall be submitted to HAWSCO upon completion of the project. The As-Built Drawing must include, at minimum, an accurate representation of the irrigation point of connection, irrigation mainline and size(s), lateral lines and sizes, valve box locations, zone valve size and sequential numbering of lateral lines, sprinkler locations (or other emission devices), and sprinkler nozzle sizes. The As-Built Drawing must also include a legend listing model and type of: sprinklers (or other emission devices), swing assembly, control valves, and piping. It is not required that the As-Built Drawing be a separate Irrigation CAD drawing. The As-Built Drawing may be adequately scaled on to an existing Landscape Drawing or Site Plan.

(b) HAWSCO will use the as-built to set scheduling, commission the controller and also determine whether an inspection is warranted to verify that all landscape and irrigation requirements were fulfilled.

IRRIGATION SYSTEM DESIGN AND CONSTRUCTION

The irrigation system must apply water to the landscape as efficiently as possible (highest possible Distribution Uniformity) by strictly following Irrigation Association and the manufacturer design specifications for the emission devices being installed. The irrigation design and lateral line layout must take into account any variation in water requirements within the landscape (e.g. different hydro-zones. Shaded landscape must be irrigated separately from landscape exposed to full sun, shrub/planter beds irrigated separately from turf grass wherever possible). This may involve the type of plant material being irrigated, depth of soil, sun exposure conditions, drainage conditions, and any other site condition that will have a significant impact on water requirements.

1. Sprinklers

(a) All sprinklers must be pressure regulated (have a pressure regulating component within the sprinkler) to prevent excessive water waste and maximize system efficiency.

(b) Sprinklers with built in check valves should be used when low head drainage will be a problem to minimize water waste and reduce erosion.

(c) The maximum sprinkler spacing shall be equal to the radius of throw of the nozzle (head to head) with appropriate allowance for wind if applicable.

(d) All sprinklers must be located and adjusted as best as possible to keep the water within the landscaped area and minimize overthrow.

(e) All sprinklers installed on a single lateral zone must have matched precipitation rates (MPR). Rotor sprinkler nozzle selection must take into account both distance of throw and the arc of the sprinkler for MPR.

(f) Sprinkler nozzles must be of the correct size for the area being irrigated. Set screw nozzle adjustment cannot be adjusted down more than 25% of the maximum radius of throw for the nozzle installed.

(g) All pop-up sprinklers shall be connected to the pipe by an adjustable swing joint assembly that is sized to meet the flow requirements of the sprinkler.

(h) All pop-up sprinklers shall be installed flush and level with the finished grade and not higher than any adjoining hard surface from which there must be at least a 2" separation to allow for edging.

(i) All stationary shrub risers shall be installed with two P.V.C. street elbows connected to the side of the lateral line pipe and a Schedule 80 nipple that is long enough to suit the plant material

(j) Sub-surface drip irrigation may be used where appropriate (non-turf applications) and at the discretion of the installation contractor. All drip irrigation must have appropriate pressure regulation and filtration devices and be installed to manufacturer's specifications. HAWSCO recommends using sub-surface drip as a last resort due to the nature of the water source.

(k) All sprinklers must be equipped with a purple cap or cover to indicate a non-potable water source.

2. Irrigation Piping and Mainline

(a) An irrigation point of connection package must be purchased and registered with HAWSCO. This package will include all specified equipment and will be installed by the irrigation contractor. HAWSCO will inspect the installation before activation of the water source.

(b) Irrigation piping should be sized appropriately to support the demands of the system. The velocity of flow of water through the piping should not exceed 5 feet per second.

(c) The irrigation mainline must be sized large enough to allow for deep root watering (minimum of 4") of the complete landscape and within an acceptable watering window (no longer than 6 hours).

(c) Polyethylene pipe (with the exception of HDPE) may not be used for irrigation mainline sizes greater than 1".

3. Irrigation Controller

To meet Harmony's water management strategy and operational requirements, a specified controller will be issued with the point of connection package, and installed by the irrigation contractor. A HAWSCO approved equivalent may also be installed with permission. All irrigation lateral zones are to be wired to operate in a logical sequence.

4. Electric Control Valves

(a) The electric remote control valve shall be a normally closed 24 VAC 50/60 Hz (cycles/sec) solenoid actuated.

(b) The valve body shall be constructed of heavy-duty glass-filled UV-resistant nylon and have stainless steel studs and flange nuts; diaphragm shall be of nylon reinforced EPDM rubber.

(c) The valve shall have both internal and external manual open/close control (internal and external bleed) for manually opening and closing the valve without electrically energizing the solenoid.

(d) The valve shall house a fully-encapsulated, one-piece solenoid. The solenoid shall have a captured plunger with a removable retainer for easy servicing and a leverage handle for easy turning. This 24 VAC 50/60 Hz solenoid shall open with 19.6 VAC minimum at 200 PSI.

(e) The valve shall have a self-cleaning stainless steel screen designed for use in dirty water applications.

(f) The valve construction shall be such as to provide for all internal parts to be removable from the top of the valve without disturbing the valve installation.

(g) The valve shall have a purple flow control handle to indicate to the user that non-potable water is being used, and not suitable for human consumption.

5. Irrigation Control Wire

(a) A spare (or tracer) wire must be installed to each valve box location. Wire gauge must be appropriate based on length of wire run and according to manufacturer's recommendations.

(b) All wire must be approved direct bury irrigation control wire.

(c) All wire connections shall have approved direct bury wire connectors (water proof) and assembled according to the manufacturer's recommendations.

(d) No wire smaller than 18 gauge shall be used in any installation. Wire sizing must follow wire manufacturer recommendation for length of wire run.

(e) All wiring shall be protected by being bundled and taped at 10 foot intervals and installed beneath the irrigation piping or in appropriately sized conduit if run independently.

(f) All wire splices must be contained within a valve box or a wire splice box.

(g) Sufficient extra wire shall be left in each valve box such that the splice may be lifted 12" above grade.

(h) White wire shall only be used as the common wire color and wire colors must be consistent from the field valve back to the controller.

5. Road, Walkway, and Hard Surface Crossing

Sleeve all irrigation under all walkways, driveways, and road crossings with SDR 35 PVC at a minimum of twice the diameter of the irrigation pipe. A field wire conduit shall be installed adjacent to the mainline sleeving under all hard surfaces. Water lines and control wire cannot share the same sleeve.

FINAL INSPECTION AND TESTING

(a) Upon completion of the irrigation system installation, sprinklers must be adjusted for correct arcs, distance of throw, sprinkler placement, and sprinkler height. All lateral zones must be operational and the system operating in good working condition.

(b) An inspection of the raw water point of connection, will be carried out by a HAWSCO representative before activation of the raw water supply. An inspection of the irrigation design and installation may be carried out at any time to ensure that the work has been completed and meets the landscape and irrigation standards set out in the specifications to conform to Harmony's water management strategy.

(c) The irrigation contractor will program the controller with a grow-in schedule to establish the landscape. HAWSCO will then commission, activate and schedule the controller after the initial grow in period, and begin to manage the raw water resource to meet Harmony's water management strategy and operational requirements.

APPENDIX E:

National Backflow Code Requirement

National Plumbing Code of Canada

Alberta Government

CANADIAN PRAIRIE CHAPTER Irrigation ASSOCIATION

National Backflow Code Requirement

Double Check Valve Assembly

Dual Check Valve

The CPCIA would like to inform you that this change affecting irrigation installation is still in effect in Alberta following the province's adoption of the 2005 National Plumbing Code.

All irrigation systems (including residential systems) installed within Alberta will be subject to the CSA B64.10-07/B64.10.1-07 section and installation of backflow preventers code and Clause 2,6,2,1,(3) in The National Plumbing Code of Canada 2010.

All testable devices will require permits, tests, and inspections for installations. This applies to any new installation. A retrofit with a new testable device will also require permits, test and inspection. **Although management of annual testing may vary significantly across municipalities, it is still required as per the National Plumbing Code of Canada.**

Please take special note of clause 5.8.2 (a) (ii) in the CSA B64.10.07 as this is a major change to what is currently being enforced. 2.6.2.1.

5.8.2 In-ground irrigation systems

Any outlet used to dispense potable water from the water distribution system to supply an in-ground irrigation system shall be protected against backflow caused by back siphoning with the following:

a) for systems without injection of chemicals:
   i. a PVB device installed upstream of the irrigation system shut-off or other control valves and at least 300 mm above the highest point of the irrigation system; or
   ii. a DCVA backflow preventer installed upstream of the irrigation system shut-off or other control valves; or

b) for systems with injection of chemicals, an RP backflow preventer installed upstream of the irrigation system shut-off valves.

2.6.2.1. Connection of Systems The National Plumbing Code of Canada 2010 2.6.2.1.(3)

DO YOU COMPLY?

For more info contact

http://www.irrigationalberta.org/

****ANNUAL TESTING TO BE DONE AS PER THE CSA B64.10-07/B64.10.1-07 AND IS THE RESPONSIBILITY OF THE OWNER.**

** If you have any questions or concerns, please contact your local municipal government office or the CPCIA.