

Irrigation Industry Association of BC

High Efficiency Irrigation Standard Backgrounder



Overview

The High Efficiency Irrigation Standard (HEIS) has been developed to improve the water efficiency of irrigation systems in British Columbia. The standard promotes the certification programs and standards of the Irrigation Industry Association of BC. The premise of the standard is that if all of the correct steps are taken, from design to installation to operation, there is a better chance that the irrigation system will be more efficient and save water.

There are 7 steps that must be followed to complete the irrigation section of the standard. A rating of 80 or higher must be achieved on average for the 7 steps in order for the HEIS standard to be achieved. Points in each tab are weighted to determine the final rating number. There are an additional 2 steps that need to be completed to achieve a High Efficiency Water Use project. These two steps are not necessarily the responsibility of the irrigation contractor so they have been separated for clarity. These steps are an assessment of the soil available on site and the collection and re-use of rainwater or reclaimed waste water. At this time the last two steps to achieve a high efficiency project have not yet been completed.

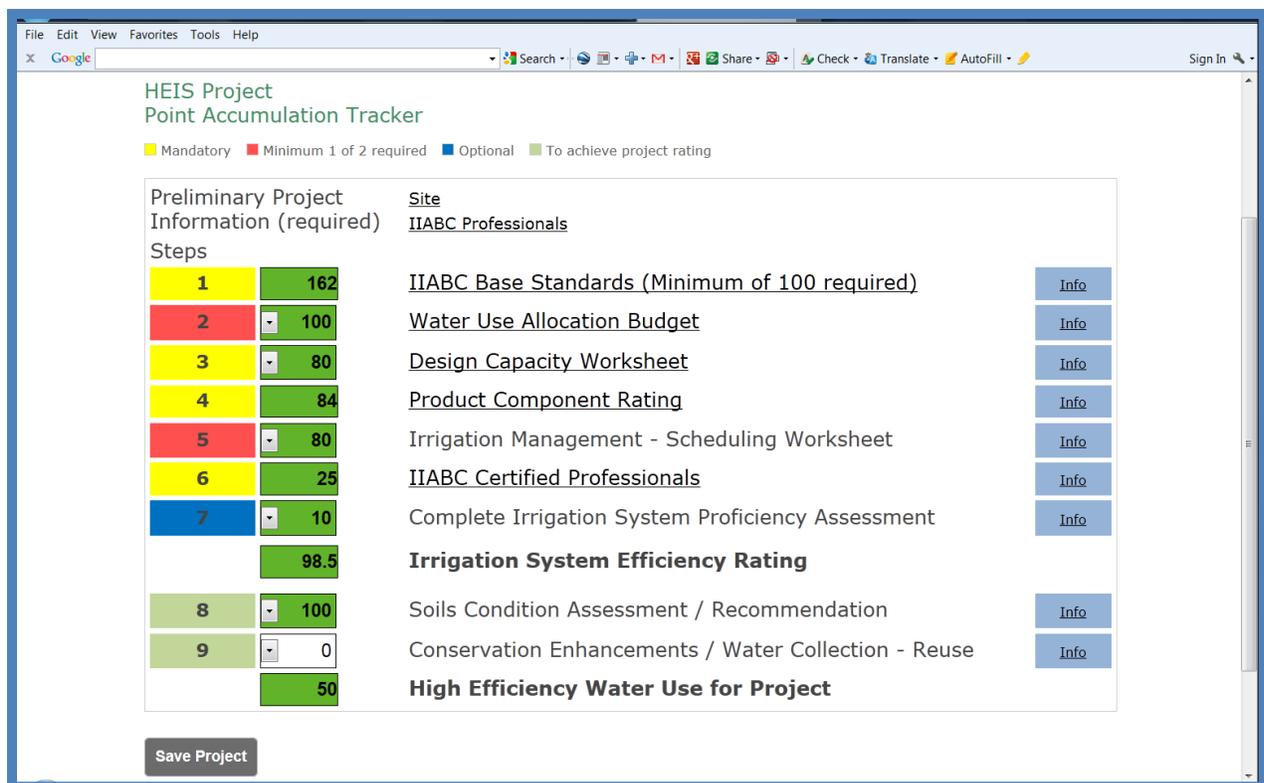


Figure 1 - Screen Shot of the HEIS Steps

This backgrounder will give an explanation of the various steps and some items to look out for. There are some items that must be done or the standard will fail. Failure will be noted in red in this document.

Accumulation Tracker

The HEIS Project homepage is also the point accumulation tracker. The HEIS standard has 6 steps that must be completed in order to receive a pass on the HEIS tracker. Failure to complete any of these steps will result in a fail, although individual steps can achieve a fail rating as long as collectively a total average of 80 points is achieved in steps 1 through 6.

Step 7 is optional and will be discussed in more detail under step 7. This step can provide additional points to achieve a pass score.

Preliminary Project Information Required

Site – this box allows the user to input the information of the site and store the scenario being developed. While anyone can use and play with the HEIS system only an authorized user can store their scenarios.

IIABC Professionals – The HEIS system will be authorized to be used by certified individuals registered with the IIABC as a Certified Technician Level 2 (CIT2), Certified Irrigation Scheduler (CIS) or a Certified Irrigation Designer (CID). A personal account will be required to obtain authorized access to the system. This will be the same as the users IIABC member account. All certified individuals will need to ensure that the IIABC has their personal email. This email will be added to the database so that individuals can then register their account to be used by the HEIS system. The personal account will only be able to be accessed by the certified individual.

Certified individuals that are authorized to use the HEIS system will be able to store scenarios and print authorized reports.

Step 1 - IIABC Base Standards

The first step acknowledges that the IIABC standards are being followed.

STANDARDS FOR HIGH EFFICIENCY LANDSCAPE IRRIGATION SYSTEMS
March 2014 Edition
IRRIGATION INDUSTRY ASSOCIATION OF BRITISH COLUMBIA

Project Compiler

General Section Score Tracker: 3 / 3 Entire Standards Score Tracker: 82 / 100

- Scope of Work**
 - Supply and install all components of an automatic irrigation system to efficiently cover the landscape.
 - Utilize the IIABC's HEIS system components calculator to confirm the system is of sufficient efficiency.
 - Provide a scaled design drawing
- Quality Assurance**
 - The combination of the following IIABC Certified Professionals must be used (see HEIS calculator):
 - Certified Irrigation Contractor
 - Certified Irrigation Designer
 - Certified Irrigation Technician – Level 2
 - Certified Irrigation Scheduler
 - The contractor is a member of the IIABC
 - A written guarantee of a minimum of one year is provided to the owner
- Submittals**
 - Provide a scaled as built drawing showing controller location, master valve, zone control valves, main water connection, blow out connection, pump and other pertinent features.
 - Provide an operating and maintenance manual.
 - Provide a base schedule based on evapotranspiration for the location of the project.
 - Provide information on how to obtain local evapotranspiration data.
 - Provide an operating schedule for all zones for the peak time of year with suggested run times for seasonal changes.
 - Provide special tools required to service installed equipment.

Figure 2 – IIABC Base Standards

If all boxes are checked the total will show 200 for this step. The value added to the point accumulation tracker will be divided by 2. Therefore the maximum value for this step will be 100. A sufficient number of boxes need to be checked to get the minimum 80 points required to have the entire HEIS rating system pass.

Since these are the base IIABC standards they should be followed and sections only eliminated after careful consideration. This section will about 15 minutes to complete but it only needs to be done once. Simply save the first scenario under a different name and the completed form will be brought forward. A user can then make the appropriate changes for the new site if required.

Step 2 Water Use Allocation Budget

The Water Use Allocation Budget step determines an annual water demand for the site based on reference evapotranspiration (ET_o). If the budget spreadsheet is not attempted then 0 points will be awarded for this step. If a budget is attempted but the water used on the site exceeds the budget then 50 points will be awarded. If the water use is below or matches the budget then 100 points are awarded.

The budget is calculated by hydrozones and the type of sprinkler equipment used in each hydrozone. Estimated water use can be reduced by appropriate landscape or plant types and by selecting efficient equipment to irrigate the various hydrozones.

Zone	Hydrozone/Landscape Feature Area (sq. ft.)	Plant Type or Landscape Feature	Landscape Coefficient (K _L)	Irrigation Type	Irrigation Efficiency (IE)	LWR _H (gal/yr)
1	250	Cool Season Turfgr.	0.8	Rotor	80	6565.43
2	500	Ground Cover	0.5	Drip - Press	95	6634.54
3	1000	Mixture of Trees, St	0.5	Fixed Spray	75	16807.5
4	250	Scrubs	0.5	Drip - Press	95	3317.27

Figure 3 – Landscape Water Requirement – Hydrozone Table

The landscape water requirement table in this step is also used in the product component step (step 4). The data filled in here will be automatically forwarded to step 4.

Step 3 Design Capacity Worksheet

The design capacity worksheet does an assessment of the operating pressure for the highest pressure requirement zone against the pressure that is available from the supply for the irrigation system. This worksheet must be completed and will require some basic knowledge about irrigation system operation, operating pressures and friction losses. Friction loss charts are provided to assist the user where required.

There are two conditions that can occur where the results will automatically cause a red flag or the HEIS to fail:

- If the pressure available to the system is less than 15% above the highest pressure zone sprinkler operating pressure then a failure will be triggered

- Under section D, if the total pressure available at the zone is less than 40 psi the box will turn red as a flag. The system can still pass providing that the zone operating pressure requirement is less than 34 psi.

Design Capacity and Dynamic Pressure Calculator

Project Compiler

A Record Site Information

1.	Static pressure at the source (main):	100	PSI
2.	Net elevation change (positive or negative) source to POC:	-25	FEET
3.	Pressure change resulting from change in elevation (Line 2 X 0.433)	-10.82	PSI
4.	Static pressure at POC (Line 1 +/- Line 3):	89.18	

	Number / Length	Size	Type of Pipe
5.	Service Line	150	1 Copper
6.	Delivery Line	100	1 PVC
7.	Water Meter	1	1 Brass
8.	Gate Valves	1	1 brass
9.	Other	0	0

B Determination of Design Capacity

10.	Pressure Loss through the Water Meter	restriction Not to exceed 10% of available PSI at the source (see Line 1)	10	GPM
11.	Volume through the Water Meter	30	Not to exceed 75% of maximum safe flow of the meter	22.5
12.	Velocity through the Service Line (Supply Main to Meter)		Not to exceed 7.5 fps	18
13.	Design Capacity		Lowest of 3 values - Lines 10, 11 & 12	10

C Calculation of Dynamic Pressure at Design Capacity

14.	PSI loss in Service Line	0.4	PSI loss per 100ft/100 x actual length in feet	100	0.4	PSI
15.	PSI loss in Delivery Line	1.4	PSI loss per 100ft/100 x actual length in feet	150	2.1	PSI
16.	PSI loss in the Water Meter at Design Capacity				5.5	PSI
17.	PSI loss in gate valves	1	Equivalence Factor		0.05	PSI
		x	5	PSI loss per 100ft of std steel pipe/100		
		x	1	Number of gate valves		
18.	Other Losses				2	PSI
19.	Total Pressure loss from the source to POC (add lines 14 - 18)				10.05	PSI
20.	Approximate Dynamic Pressure at Design Capacity (subtract Line 19 from Line 4)				79.13	PSI

D. Estimation of Pressure available at Worse - Case Head

21.	Pressure change due to elevation change from the POC to the Highest Head in the system.	-10	ft. x .433	-4.33	PSI
22.	Pressure subtotal (subtract Line 21 from Line 20.)			74.8	PSI
23.	Estimated Pressure Available at worst case head (two - thirds of subtotal: Line 22 psi x .67)			50.11	PSI

Save Project

Figure 4 Design Capacity Worksheet

Step 4 Product Rating Guide

The product rating guide assesses what kind of equipment is being used in the design and installation of the irrigation system. There are a number of conditions that can cause failure for the HEIS under the Product Rating Tool:

- If the rating in this section is **less than 75 points** the HEIS system **will fail**
- If the system does **not have an automatic controller** selected the rating **will fail**
- If a **backflow preventer** has **not been selected** the rating **will fail**
- If there is **no automatic valve** the rating **will fail**.
- If a **pressure regulator** is required and not included the rating **will fail**.
- If an **emission (sprinkler) device** is not selected the rating **will fail**

The box at the right hand top of the screen will indicate which components are missing.

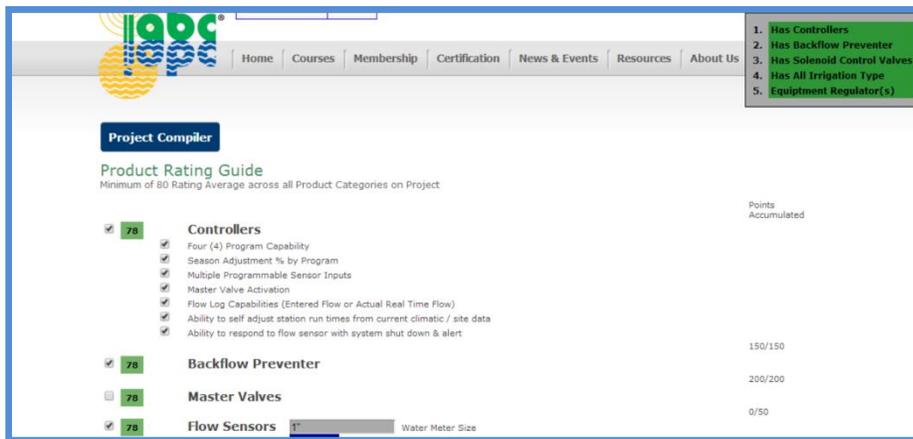


Figure 5 Key component requirement box (top right hand corner)

The hydrozone table discussed in Step 2 (Water Allocation Budget) is also included under the Product Rating Tool tab under the sprinkler equipment section. It will already be populated if it was filled out in Step 2. If not it will need to be filled out here. The information required under the product rating tool will be the hydrozone area, plant type, sprinkler type, sprinkler operating pressure and sprinkler efficiency.

The system will calculate the percentage area of each product being used on the site. The rating determined for the sprinkler equipment portion of the product rating tool will be based on the area covered by each product. A higher percentage of the site using more efficient equipment will obtain a higher rating number. Selecting more efficient equipment on the larger areas will help to obtain a pass on this section.

The **sprinkler section** of the Product Rating tab will **default to 0** if the sprinkler product selected has an operating pressure that exceeds the pressure available at the site as determined in Step 3.

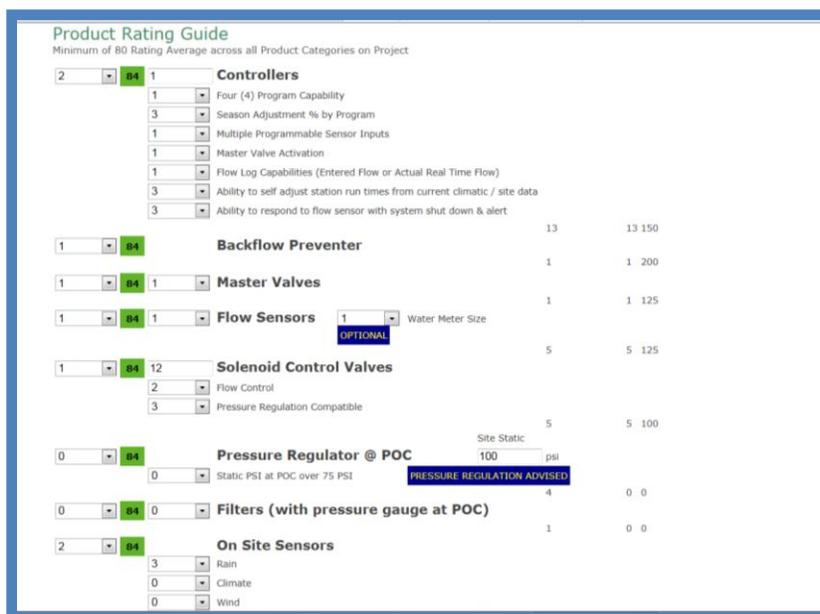


Figure 6 Product Rating Guide

Step 5 Irrigation Scheduling Calculator

Step 5, the Irrigation Scheduling Calculator tab links to the IIABC Irrigation Scheduler. Completing an irrigation schedule will be awarded 80 points. A print out of the schedule must be attached to a printout of the HEIS summary. The irrigation schedule report should be considered part of the HEIS report. Not every zone will require a schedule to be developed but zones using different products or having different plant material will require a schedule.

Step 6 IIABC Certified Professionals

This step will acknowledge the expertise that has been used in the installation of an irrigation system. The rating system is out of 100 points with the following points awarded to each category:

- CID 25 points
- CIC 25 points
- CIT 2 12.5 points
- CIS pre construction – developing the irrigation schedule 12.5 points
- CIS post construction 25 points

The HEIS system will **automatically fail** if a **CID is not selected**. Therefore the minimum points required for this tab is 25 points. **It is expected that every irrigation system that has obtained the designation of a HEIS will have a certified design completed and available for review.**

The names selected for each category are obtained by a search from the IIABC Certified Professionals database. If a person or company is not recognized by the IIABC in a specific certification the name will not be found and cannot be entered into this section.

IIABC Certified Professionals Point Accumulation

Certifications (complete professional certification submittal for each category establishing points - click on the appropriate certification drop down box)

Assigned User			
CID	Ted Van der Gullik	10	Irrigation Design Completed by CID
CIC	Administrator eVision	10	Certified Irrigation Contractor
CITII	Karen Hounsorne	5	Certified Staff installing project
CIS	Administrator eVision	5	Pre Construction Irrigation Schedule developed
CIS		10	Post Construction System Audit conducted

100 Overall Project IIABC Certified Professional Rating

Figure 7 IIABC Certified Irrigation Professionals

Step 7 Complete Irrigation System Proficiency Assessment

Step 7 is optional, however it is strongly suggested that a post installation assessment be completed for every HEIS system. Having a qualified individual check the system after installation is useful to determine if the controller has the appropriate schedules, the sprinkler heads are set properly and the system is performing the way it was designed. Step 7 may provide the extra points required to pass the HEIS standard. If a CIS performs an irrigation assessment after the system has been installed additional points can be awarded. The post installation report will have to be attached to the HEIS report for these points to be awarded.

A total of 5 points are awarded if a post system installation check is done and 10 points if a CIS does a proper assessment. These points are added directly to the HEIS score.