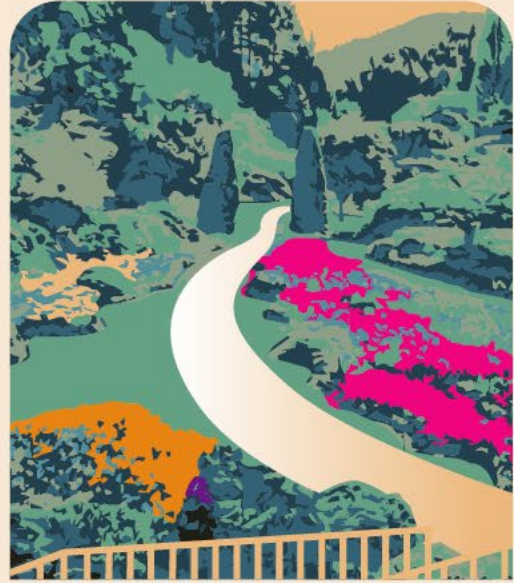


American Society of Irrigation Consultants
2024 NATIONAL CONFERENCE
VICTORIA, BC | MAY 5-7, 2024

WELCOME



American Society of Irrigation Consultants
2024 NATIONAL CONFERENCE
VICTORIA, BC | MAY 5-7, 2024

Golf Irrigation and the Corporate Spin

Brett Finlayson

Corporate Director of Grounds Maintenance

GolfBC Group

Who am I?



- 20+ years in the golf industry
 - 11 in the private club world
 - Last 13 with GolfBC Group
 - 10 as Superintendent (3 in transition)
 - 6 in corporate role
- Over \$23M in capital
- Help our Superintendents
- Purchasing and corporate agreements
- President of BCGSA and AGA-BC

Who is GolfBC?



- Burrard International Holdings Inc – Family business
- Landholdings
- Owners/operators of 6 properties/10 golf courses
 - 7 courses in British Columbia, Canada
 - 3 courses on Maui
- Progressive
- Team Member Longevity

Our Grounds Maintenance Team



2024 NATIONAL CONFERENCE | VICTORIA, BC | MAY 5–7, 2024

Our Corporate Team



2024 NATIONAL CONFERENCE | VICTORIA, BC | MAY 5-7, 2024

Corporation vs. Standalone



- Different type of companies
- Culture
- Structure
- Uniformity/consistency of brand/product
 - Table Nineteen
 - Golfshops
 - Golf course management practices – work in progress
- Knowledge sharing
- Priorities
- Vendor agreements
- Financial expectations

Potential challenges with a corporation



- Perception of expensive
- Financial impact
 - ROI
 - Competing capital
 - Economy
- Working with the development team
- Tight timelines
- Different priorities or long-term objectives
- Fall through the cracks

How I convinced GolfBC to start working with a consultant?



- Knowledge
- Communication
- Service/support – relationships
- Consistency
- Planning
- Can we afford not to hire a consultant?

Keys to success



- Learn key players - educate
- Understand concerns and expectations
- Help sell
 - ROI
 - Build momentum
 - Build trust
- Honesty

Thank you!



2024 NATIONAL CONFERENCE | VICTORIA, BC | MAY 5–7, 2024



American Society of Irrigation Consultants
2024 NATIONAL CONFERENCE
VICTORIA, BC | MAY 5-7, 2024

Green Roofs & Green Walls

Moderator: Doug Macdonald, Aqua Engineering, Inc.

Panelists:

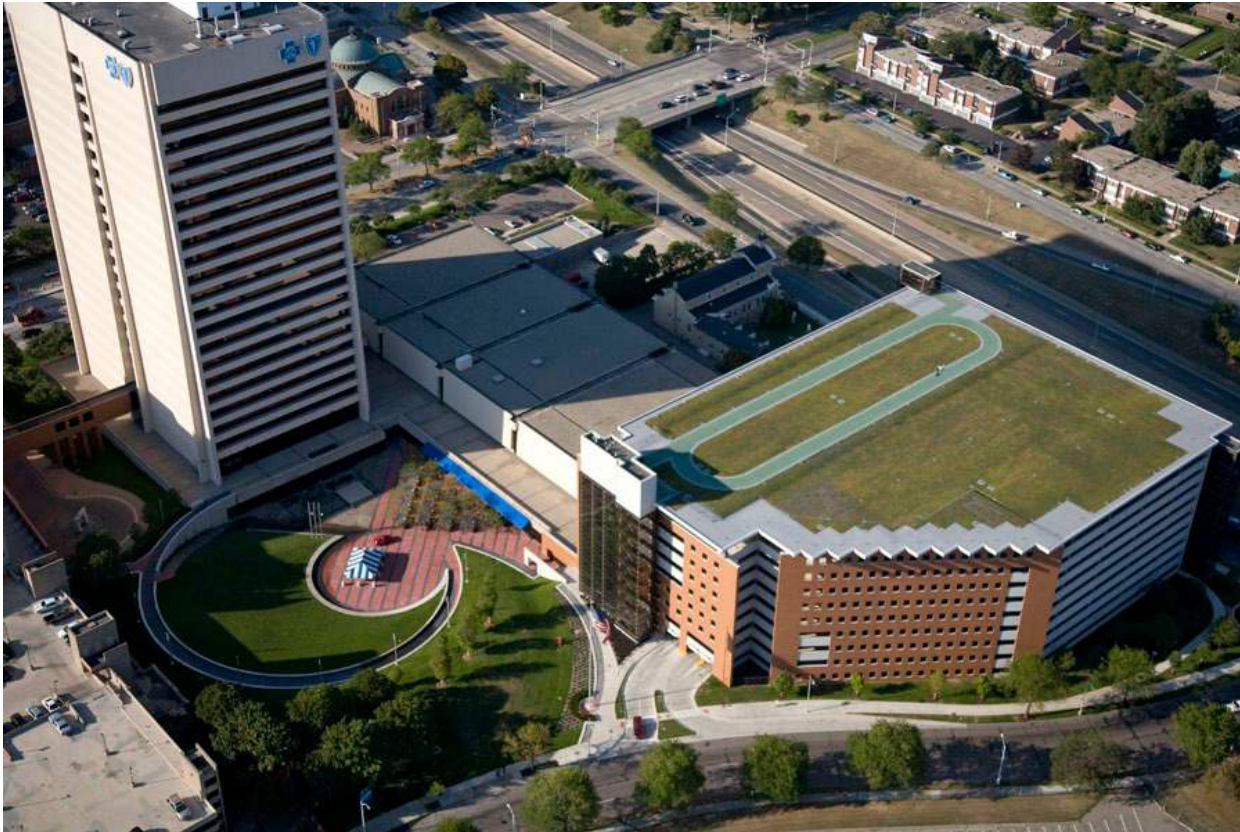
Chris Mitchell, Russell D. Mitchell & Associates, Inc.

Geoffrey Graber, Graber & Associates, LLC

Dave Langendorff, ISC Group, Inc.

Green Roofs & Green Walls

Reasons to Consider Green Roof/Green Walls



2024 NATIONAL CONFERENCE | VICTORIA, BC | MAY 5-7, 2024

Green Roofs & Green Walls

POC COORDINATION

- Water Source Options
- Metering/POC



Green Roofs & Green Walls

OVERSTRUCTURE PIPE COORDINATION

- MEP/Architect



Green Roofs & Green Walls

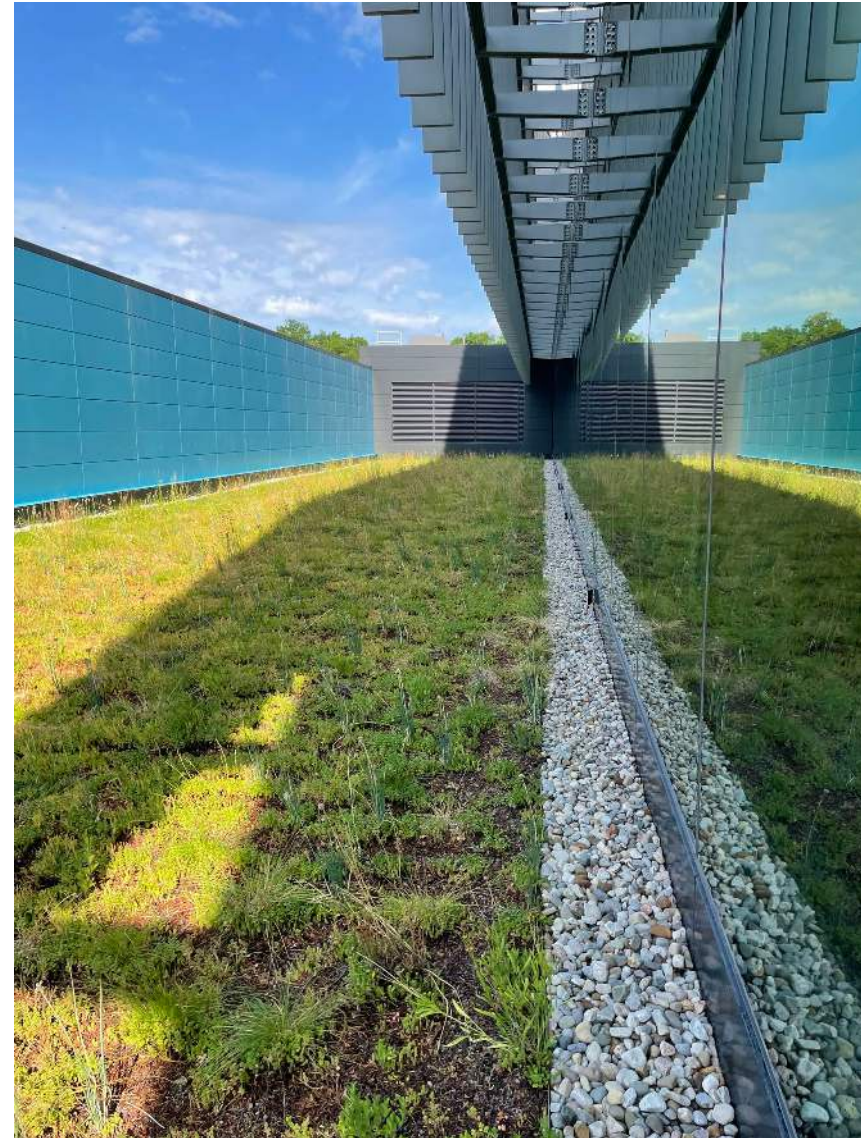
Maintenance Access Challenges



2024 NATIONAL CONFERENCE | VICTORIA, BC | MAY 5-7, 2024

Green Roof Techniques

Drip vs Sprinklers



2024 NATIONAL CONFERENCE | VICTORIA, BC | MAY 5-7, 2024

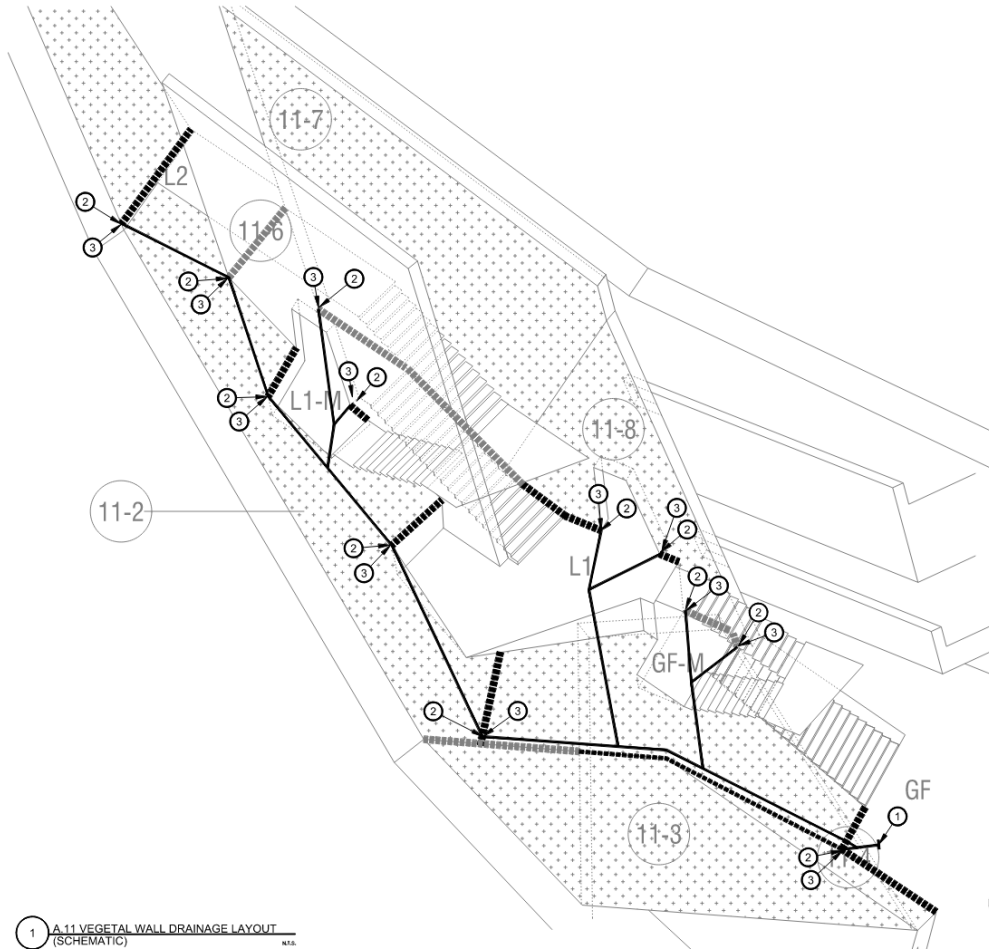
Green Walls

Planting Media Alternatives



2024 NATIONAL CONFERENCE | VICTORIA, BC | MAY 5-7, 2024

Drip application/piping strategies

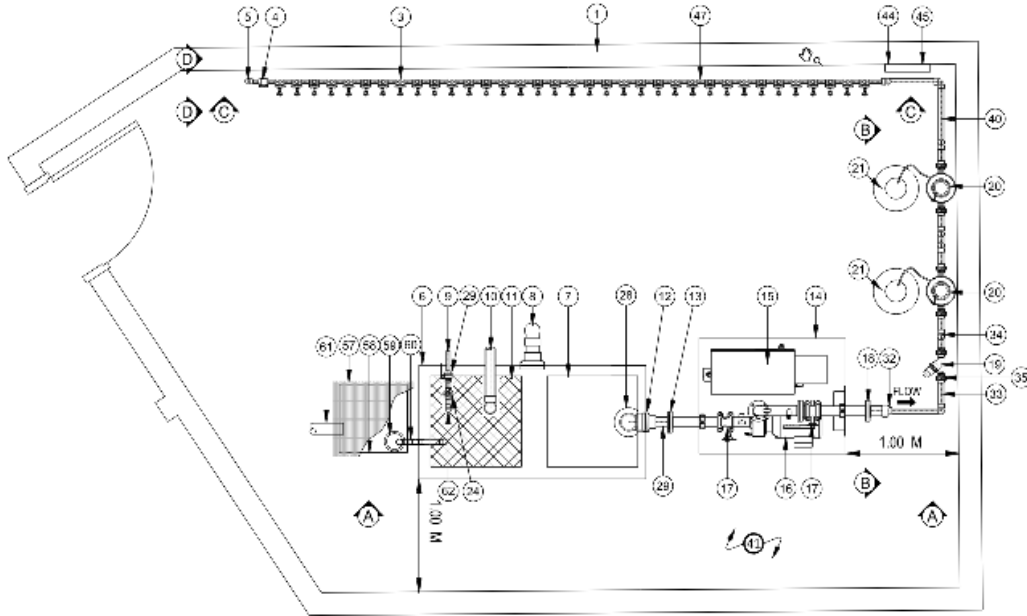


IRRIGATION RUN OFF WATER FROM THE VEGETAL WALL FABRIC IS COLLECTED BY GUTTER
STYL



Green Wall Techniques

Complex Mechanical Systems

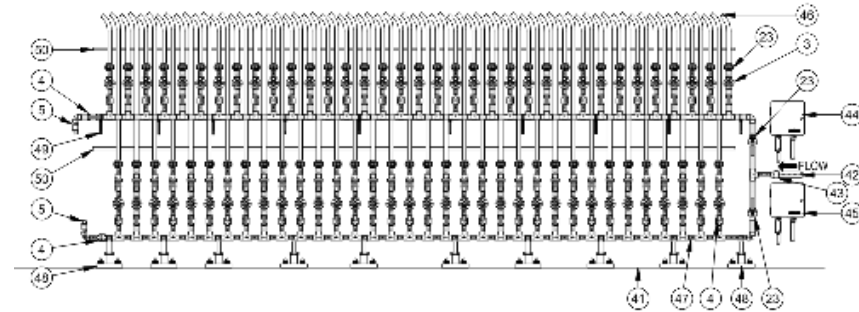


1 A11 FISSURE GARDEN EQUIPMENT ASSEMBLY (SCHEMATIC)

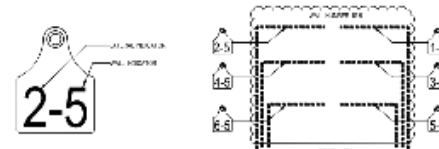
NOTES:

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.

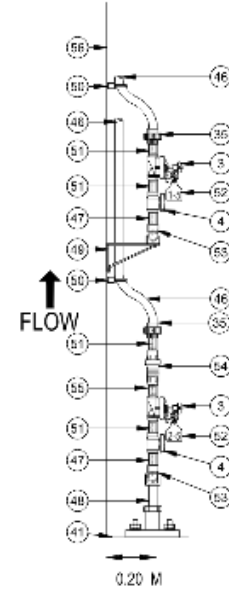
2. REFER TO SHEET 2000 FOR EQUIPMENT TAGS.



C SECTION C - VALVE BANK ASSEMBLY



NOTES:
1. REFER TO SHEET 2000 FOR EQUIPMENT TAGS.
2. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
3. REFER TO SHEET 2000 FOR EQUIPMENT TAGS.
4. REFER TO SHEET 2000 FOR EQUIPMENT TAGS.
5. REFER TO SHEET 2000 FOR EQUIPMENT TAGS.



D SECTION D - LATERAL VALVE ASSEMBLY

NOTES:
1. REFER TO SHEET 2000 FOR EQUIPMENT TAGS.
2. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
3. REFER TO SHEET 2000 FOR EQUIPMENT TAGS.
4. REFER TO SHEET 2000 FOR EQUIPMENT TAGS.
5. REFER TO SHEET 2000 FOR EQUIPMENT TAGS.



QUESTIONS/COMMENTS



American Society of Irrigation Consultants
2024 NATIONAL CONFERENCE
VICTORIA, BC | MAY 5-7, 2024



American Society of Irrigation Consultants
2024 NATIONAL CONFERENCE
VICTORIA, BC | MAY 5-7, 2024

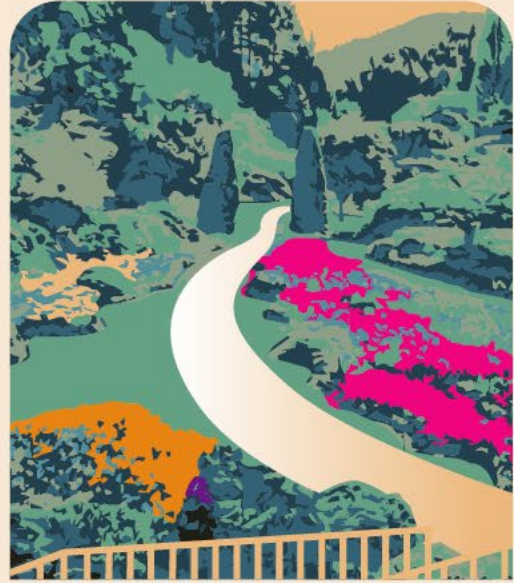
Issues of Owner Purchased Contractor Installed Projects?

Jim Barrett, Mike Prevost, Brian Vinchesi

THE QUESTION



- Should you allow/advocate for or against Owner purchase of materials for installation by the Contractor?
 - Golf versus Commercial
 - Public versus Private



American Society of Irrigation Consultants
2024 NATIONAL CONFERENCE
VICTORIA, BC | MAY 5-7, 2024

Piloting the Issues of Owner Purchased Contractor Installed Projects

The Craziest Thing This Year



American Society of Irrigation Consultants
2024 NATIONAL CONFERENCE
VICTORIA, BC | MAY 5-7, 2024



American Society of Irrigation Consultants
2024 NATIONAL CONFERENCE
VICTORIA, BC | MAY 5-7, 2024



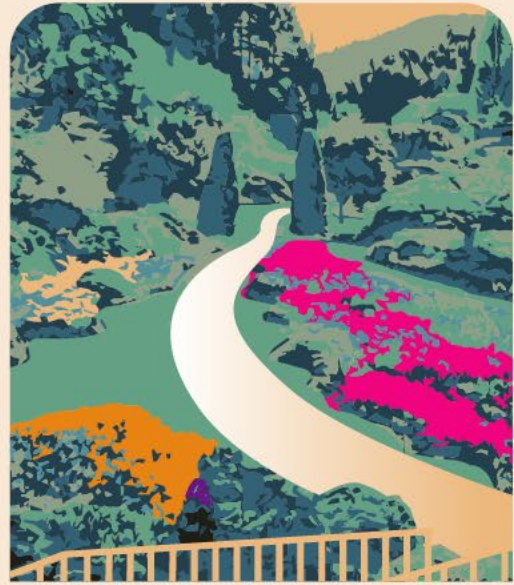
American Society of Irrigation Consultants
2024 NATIONAL CONFERENCE
VICTORIA, BC | MAY 5-7, 2024



The Craziest Thing This Year

2024 NATIONAL CONFERENCE | VICTORIA, BC | MAY 5–7, 2024





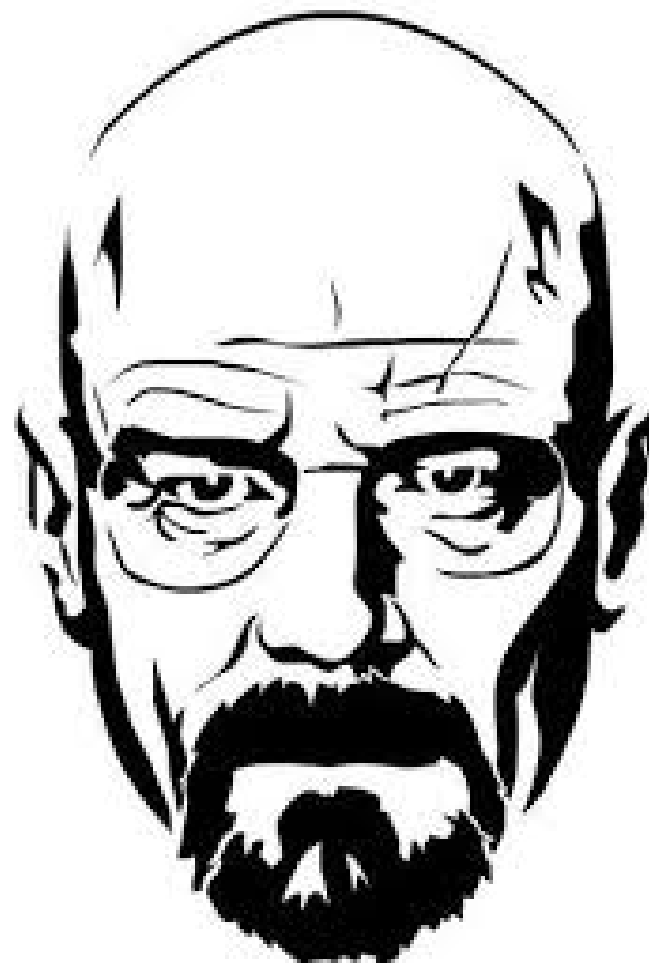
American Society of Irrigation Consultants
2024 NATIONAL CONFERENCE
VICTORIA, BC | MAY 5-7, 2024

Hydroponics Systems in Cannabis Cultivation

Omar Alcantara – Bill Millward – Allister Cooney



=



2024 NATIONAL CONFERENCE | VICTORIA, BC | MAY 5-7, 2024



=



2024 NATIONAL CONFERENCE | VICTORIA, BC | MAY 5-7, 2024



=

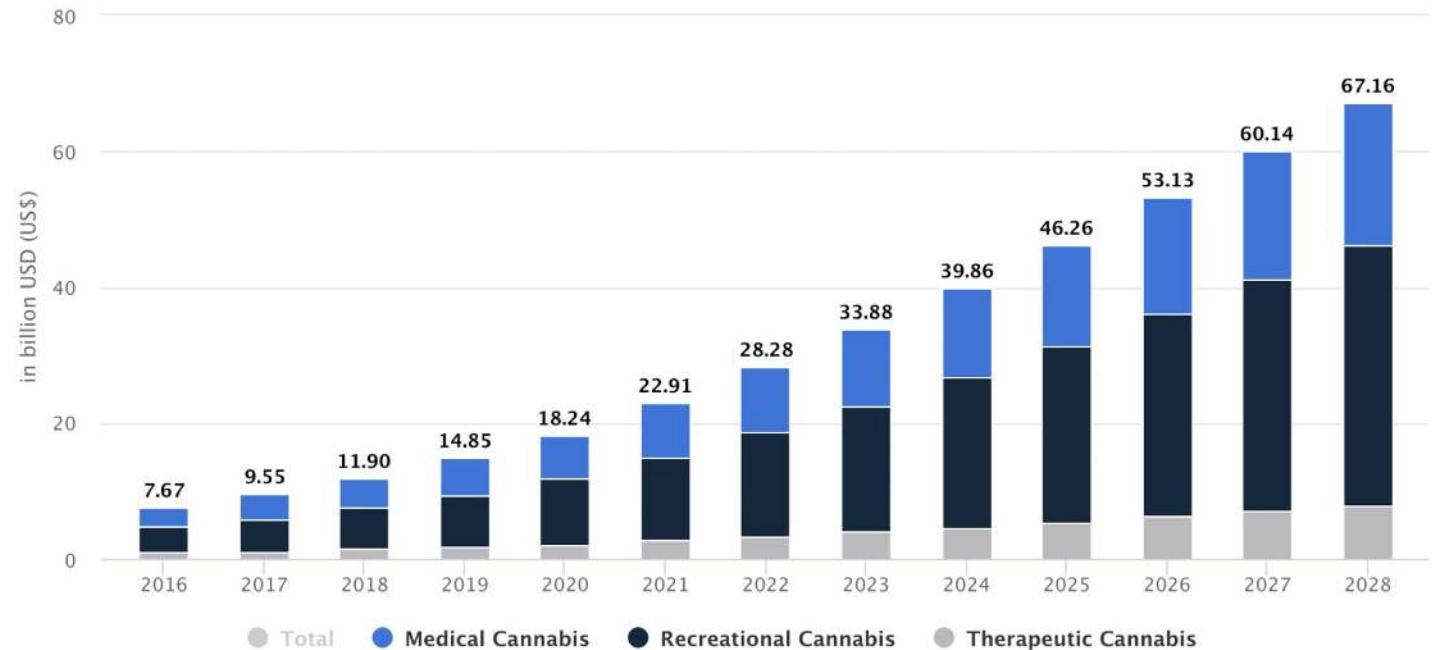


Industry Overview



- Total revenue from Cannabis is projected to reach \$39.85bn in 2024 and is projected to reach \$67bn by 2028
- Cannabis will add \$115.2 billion to the economy in 2024 and projected to reach \$170.7bn by 2028
- Medical marijuana is now legal in 40 US states and is legal recreationally in 24 states
- Cannabis is only fully illegal in 4 states and CBD in 3

*Per Flowhub, Statista, Leafwell and Axios

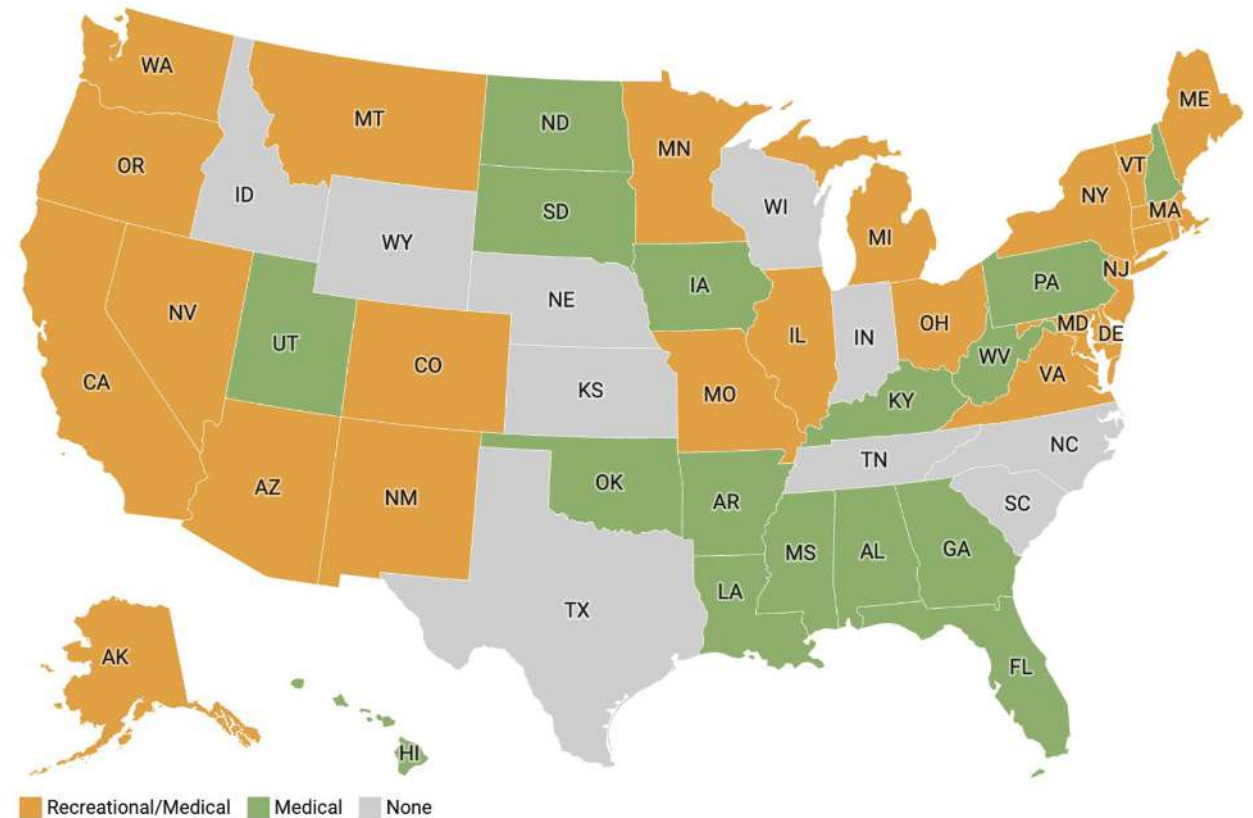


Key Challenges - Macro



- Price decline from 32% from Q3 2021 to Q2 2023
- Brands are consolidating
- Cannabis companies cannot legally access traditional banking services
- Federal legislation to legalize cannabis is stalled
- Pest and Pathogen management

*Per Flowhub



2024 NATIONAL CONFERENCE | VICTORIA, BC | MAY 5-7, 2024

Key Challenges – System Design



- Filtration:
 - Type? Level? Cost? Wastage?
- Controls and Nutrient Mixing / Delivery:
 - Cost? Complexity? Spatial Requirements?
- Water / Nutrient Usage and Recovery?
 - Required? / Desired?
- Delivery and Emission Type:
 - Cost? Automation? Complexity? Flexibility / Adaptability?



Major Components – Filtration

- Water Quality: Most growers prefer a consistent starting water quality. The “gold standard” for filtration are reverse osmosis systems;
- Pro: close to zero TDS
- Con’s: high running costs and wastage



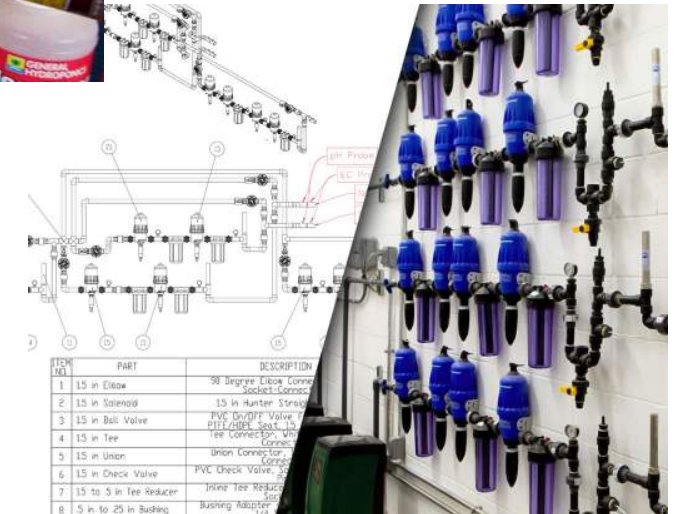
R1-12140
Reverse Osmosis System



Major Components - Fertigation



- Fertigation strategies range from very basic hand mixing, to rudimentary hydraulic fertilizer pumps, to sophisticated, fully automated fertigation systems

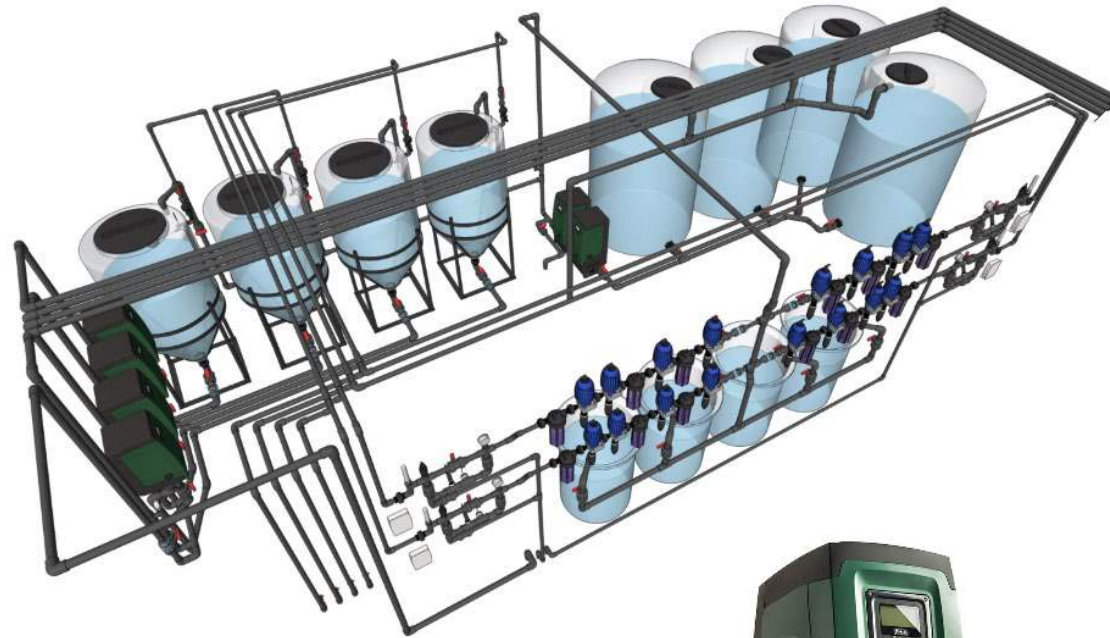


2024 NATIONAL CONFERENCE | VICTORIA, BC | MAY 5-7, 2024

Major Components – Tanks and Pumps



- Storage tanks for clean water, concentrate nutrients and dilute nutrient recipes are required. Selection factors include size, type and cost
- Pumps are needed for movement of water and nutrients from stage to stage. Selection factors include type, cost and range of flow



Major Components – Nutrient Mixing

- Conversion of dry nutrients to liquid form requires care and is time consuming. System components that reduce labor and improve consistency are desirable if not always essential

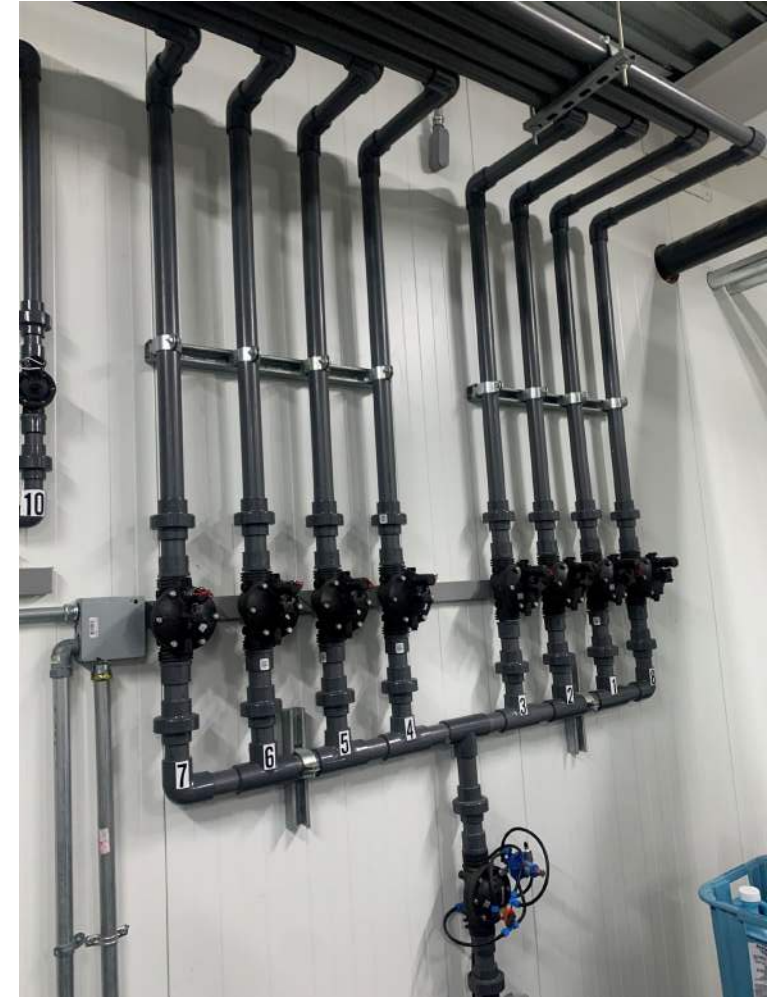
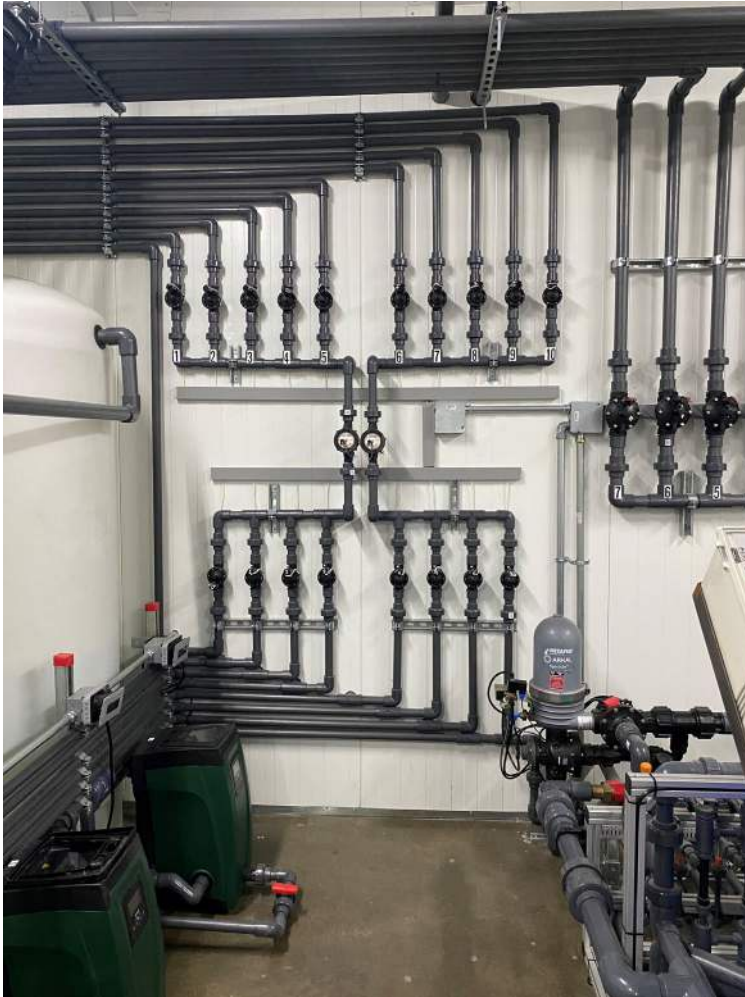


Major Components - Recycling

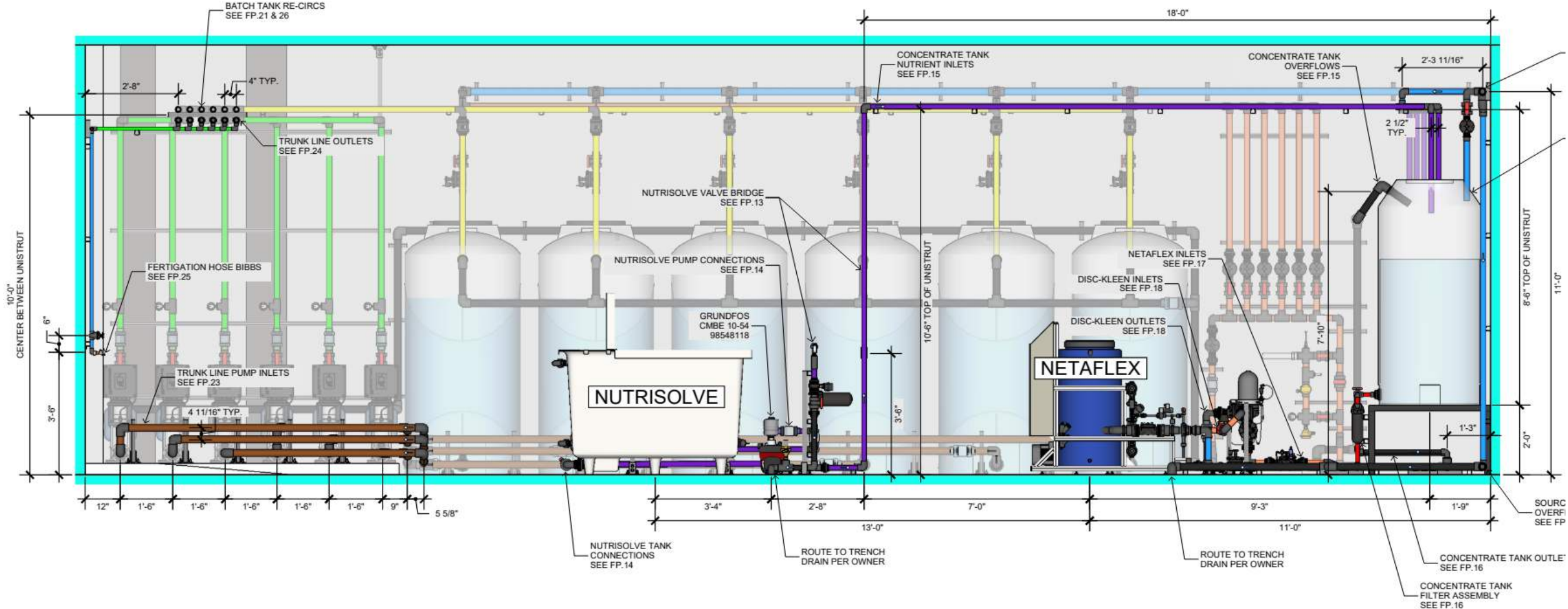
- Nutrient and water recovery and recycling may be required, or desired
- Recovery and treatment systems must be economical and demonstrate a speedy ROI
- Systems range from RO, to Ultra Filtration, chemical (eg; Ozone), UV or pasteurization



Major Components – System Plumbing



Major Components – Fertigation Room Layout



Hydroponic Irrigation Methods



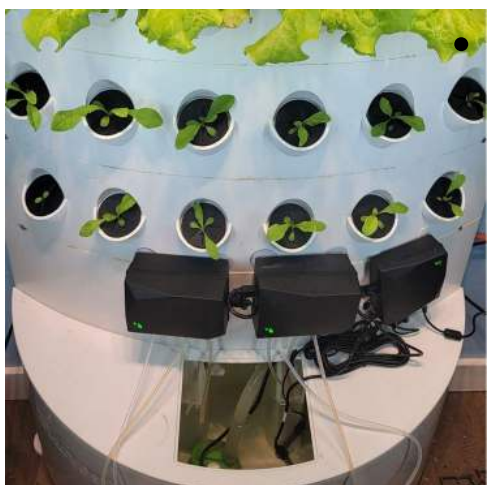
Micro Irrigation

- Controlled drip irrigation utilizing soilless media such as rockwool or coco



Ebb and Flow

- Flooded tables or containers containing media such as expanded clay pellets



Aeroponics

- Misted nutrient water sprayed over roots



Deep Water Culture

- DWC suspends roots in nutrient solution

Agronomic Aspects of Micro Irrigation



- Low flow rate preferred; reduces “channeling” and prevent air from being pushed from the media
- Controlled low flows reduce humidity controlled fungus and other pathogens
- Cannabis plants are sensitive to shortage or excess of moisture – micro irrigation helps control these extremes
- Micro irrigation allows for “crop steering”



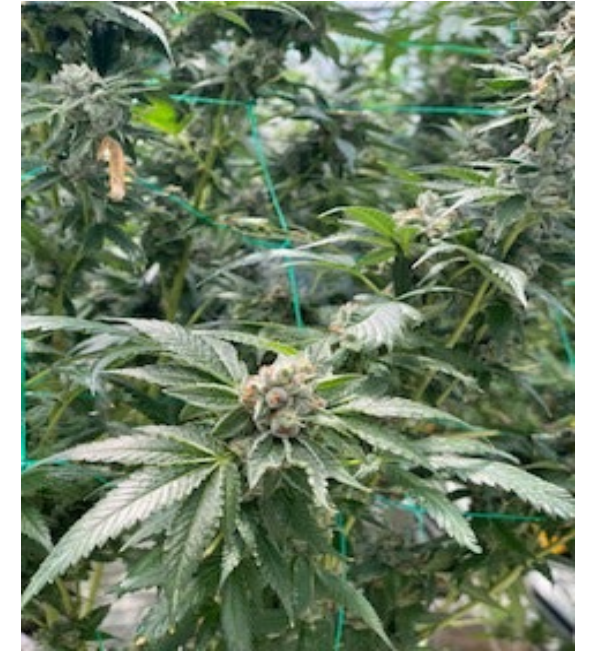
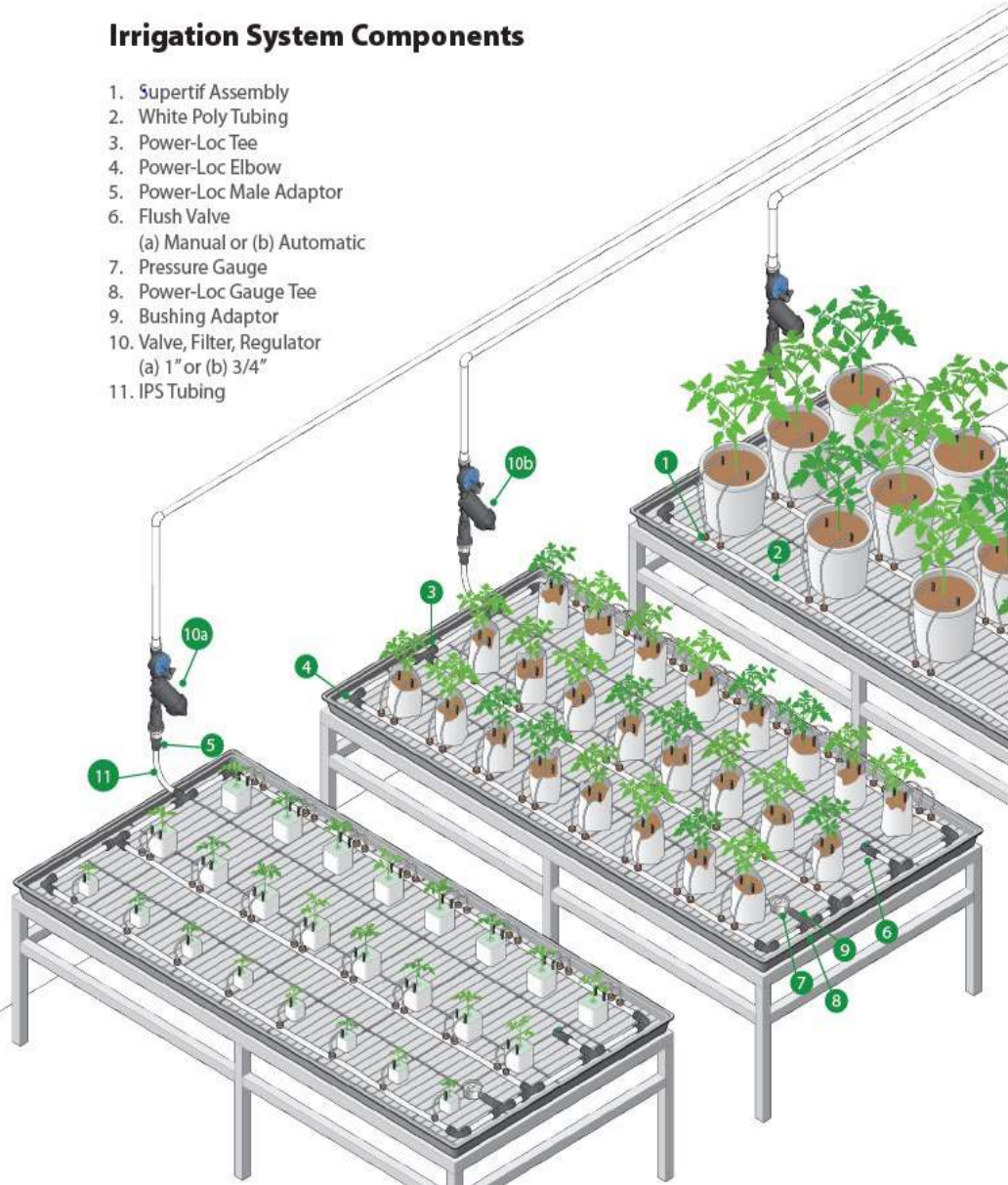
Mom's, Clones, Flower



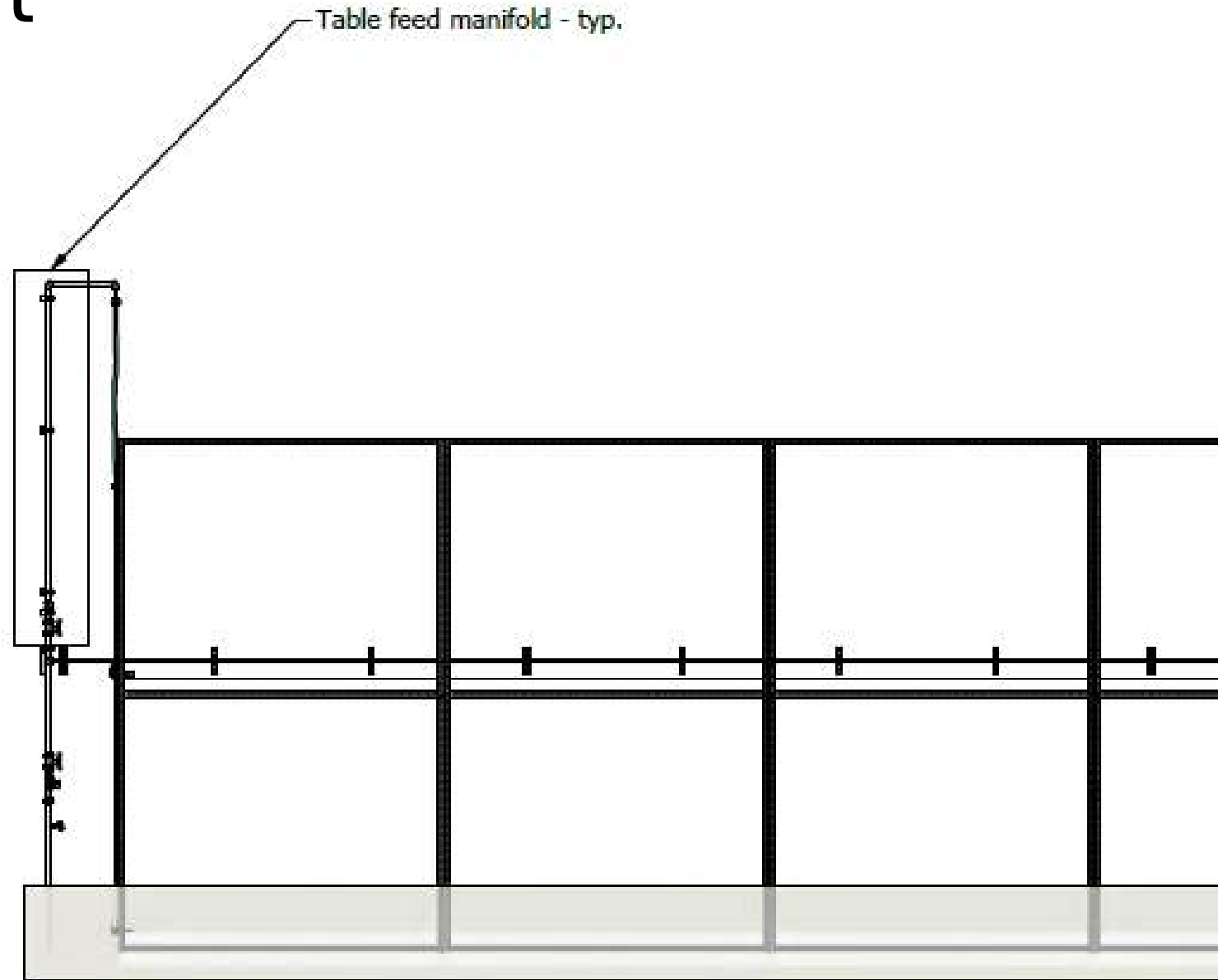
Irrigation Layout & Components

Irrigation System Components

1. Supertif Assembly
2. White Poly Tubing
3. Power-Loc Tee
4. Power-Loc Elbow
5. Power-Loc Male Adaptor
6. Flush Valve
7. Pressure Gauge
8. Power-Loc Gauge Tee
9. Bushing Adaptor
10. Valve, Filter, Regulator
(a) 1" or (b) 3/4"
11. IPS Tubing



Bench System Layout



Micro Irrigation



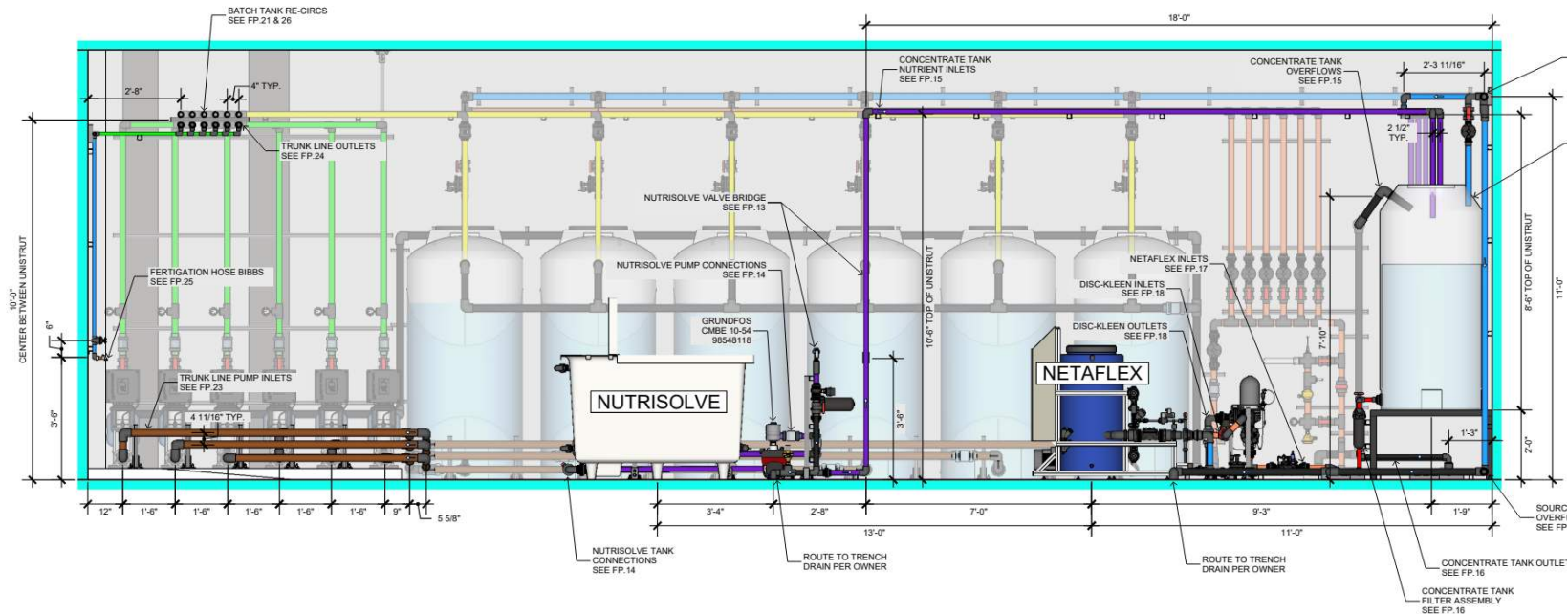
The Process



Water Use Calculations



- A significant number of decisions revolve around the total estimated water usage of the facility such as sizing of storage tanks, pumps, Fertigation systems, and plumbing
- For micro irrigation systems, a good “max” estimate is apx 0.65gpd for “flower room” plants and 0.35gpd for “veg room” plants
- This allow for some oversizing without wasting valuable space



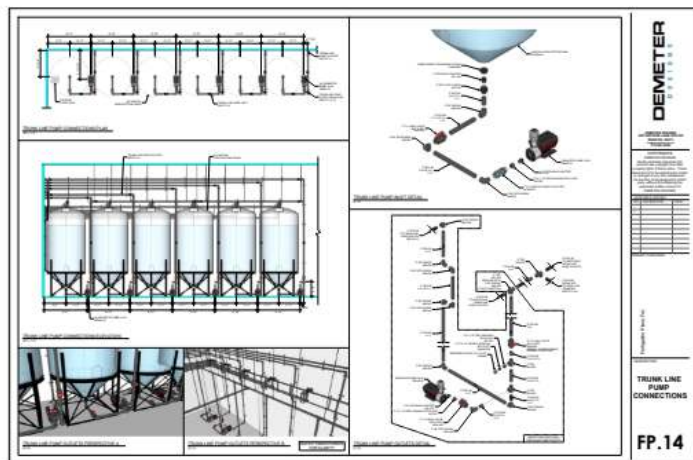
Cannabis Facility Designs



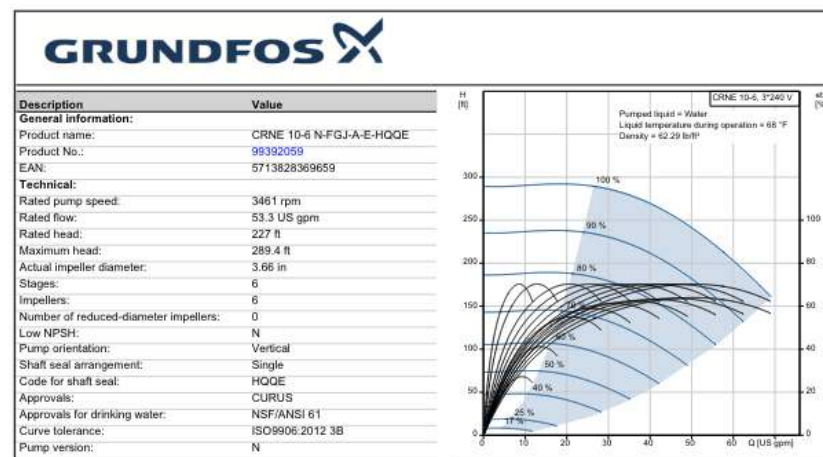
- Facility designs can range from fairly rudimentary sketches, to traditional 2D plans and elevations to fully rendered 3D designs
- Design work has come a long way in the last few years
- 3D work has the advantage of portraying the system in its true form



Cannabis Facility Designs



CONSTRUCTION DOCUMENTS



EQUIPMENT SPEC SHEETS

[illegible]

COMPLETE PARTS LIST



PHOTOREALISTIC 3D RENDERINGS

BC | MAY 5-7, 2024



Questions?



American Society of Irrigation Consultants
2024 NATIONAL CONFERENCE
VICTORIA, BC | MAY 5-7, 2024



American Society of Irrigation Consultants
2024 NATIONAL CONFERENCE
VICTORIA, BC | MAY 5-7, 2024

Green Roofs & Dog Parks

Moderator: Doug Macdonald, Aqua Engineering, Inc.

Panelists:

Carey June, Irrigation Consultant Services, Inc.

Chris Curry, Glasir Design

Jeff Bowman, Irrigation Consulting, Inc.

Green Roofs

Planter Types

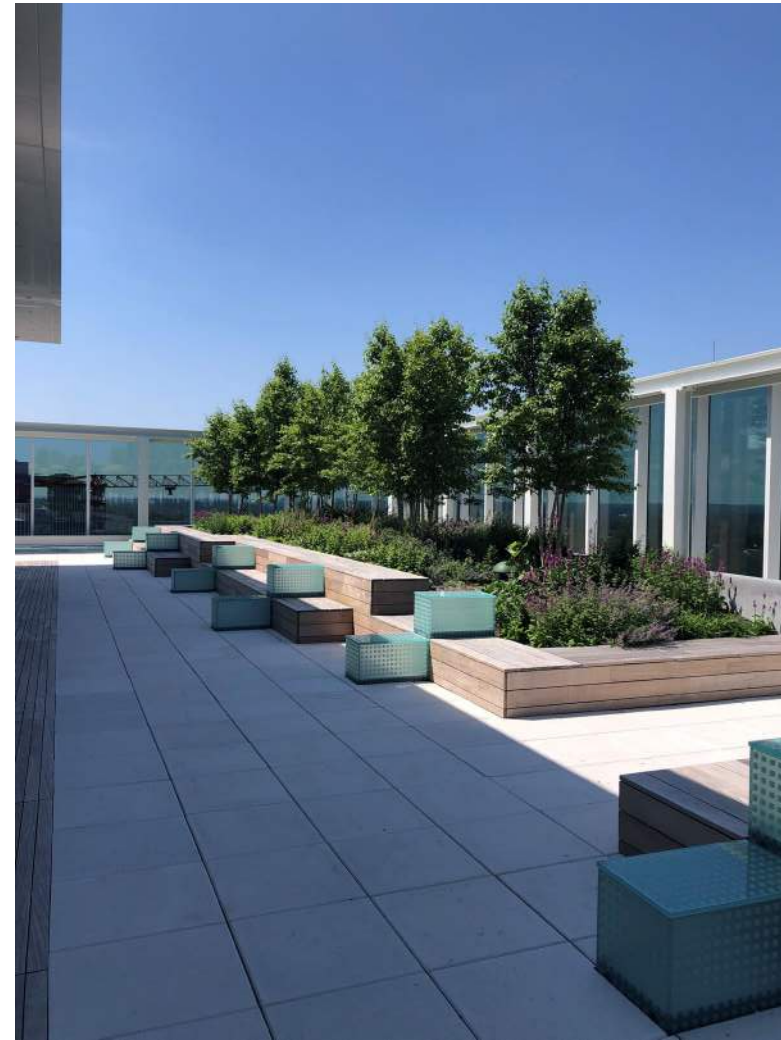
- Large Self-contained Trays



Green Roofs

Planter Types

- “Bathtub” Planters



Green Roofs

Planter Types

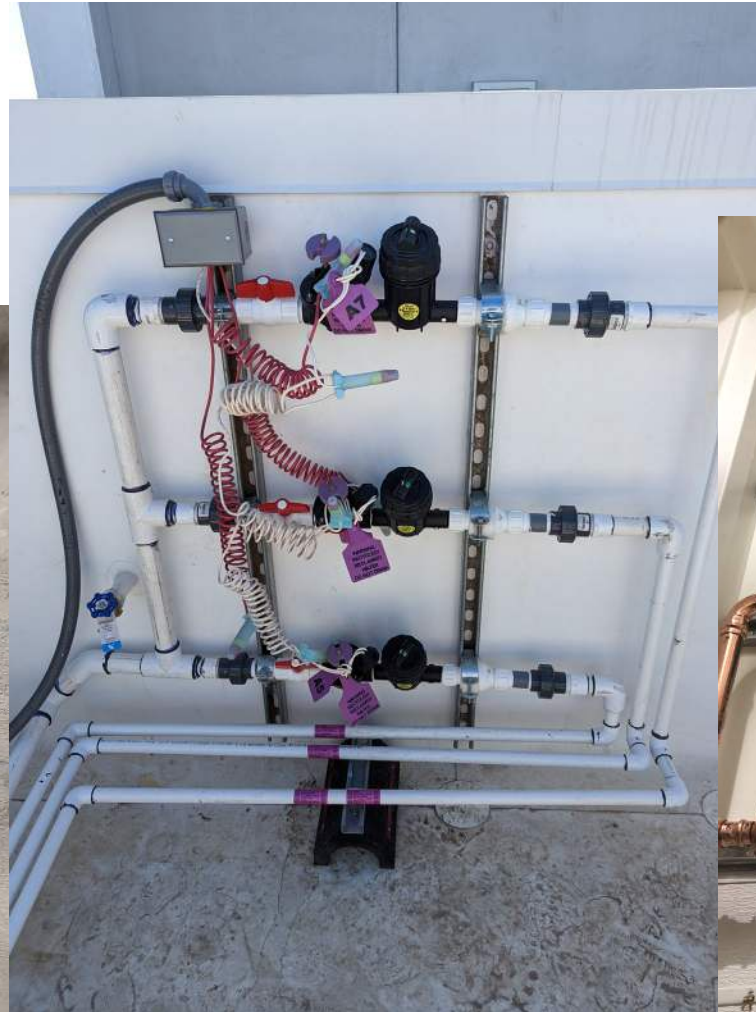
- Soil Profile – Extensive/Intensive



2024 NATIONAL CONFERENCE | VICTORIA, BC | MAY 5-7, 2024

Green Roofs

MEP Coordination

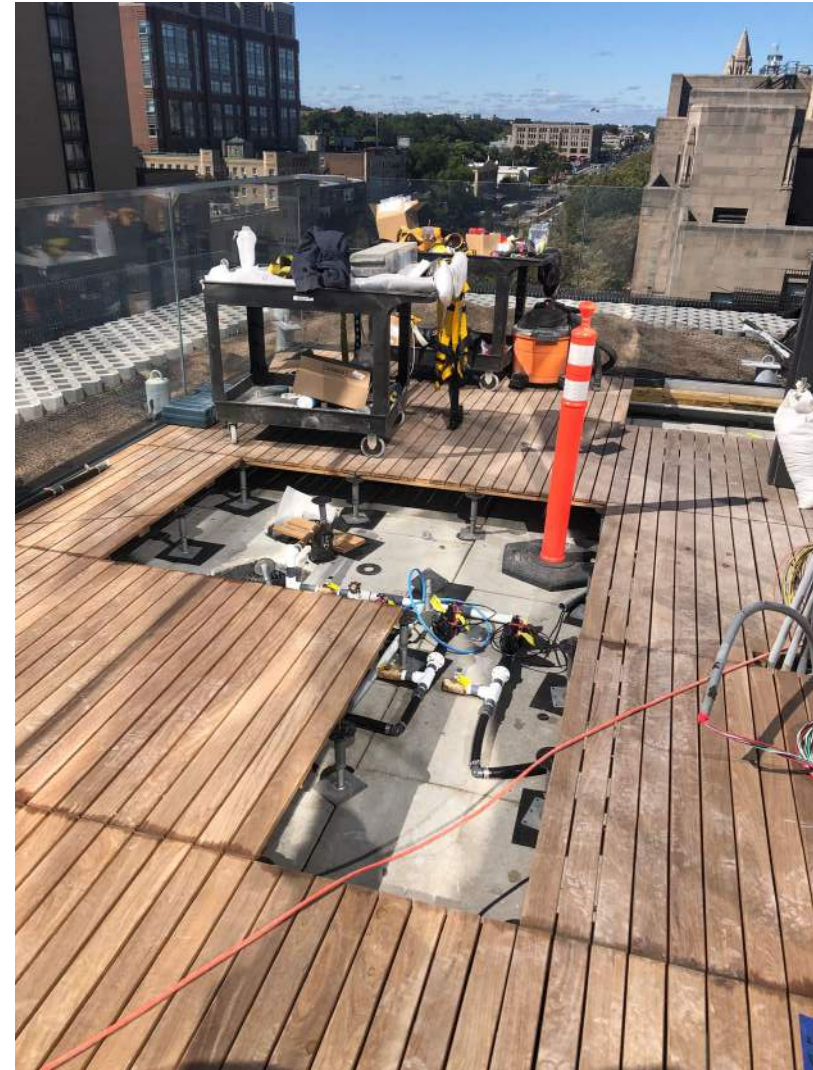


2024 NATIONAL CONFERENCE | VICTORIA, BC | MAY 5-7, 2024

Green Roofs

Maintenance Access to Equipment

- Removable Pavers



Green Roofs

Maintenance Access to Equipment

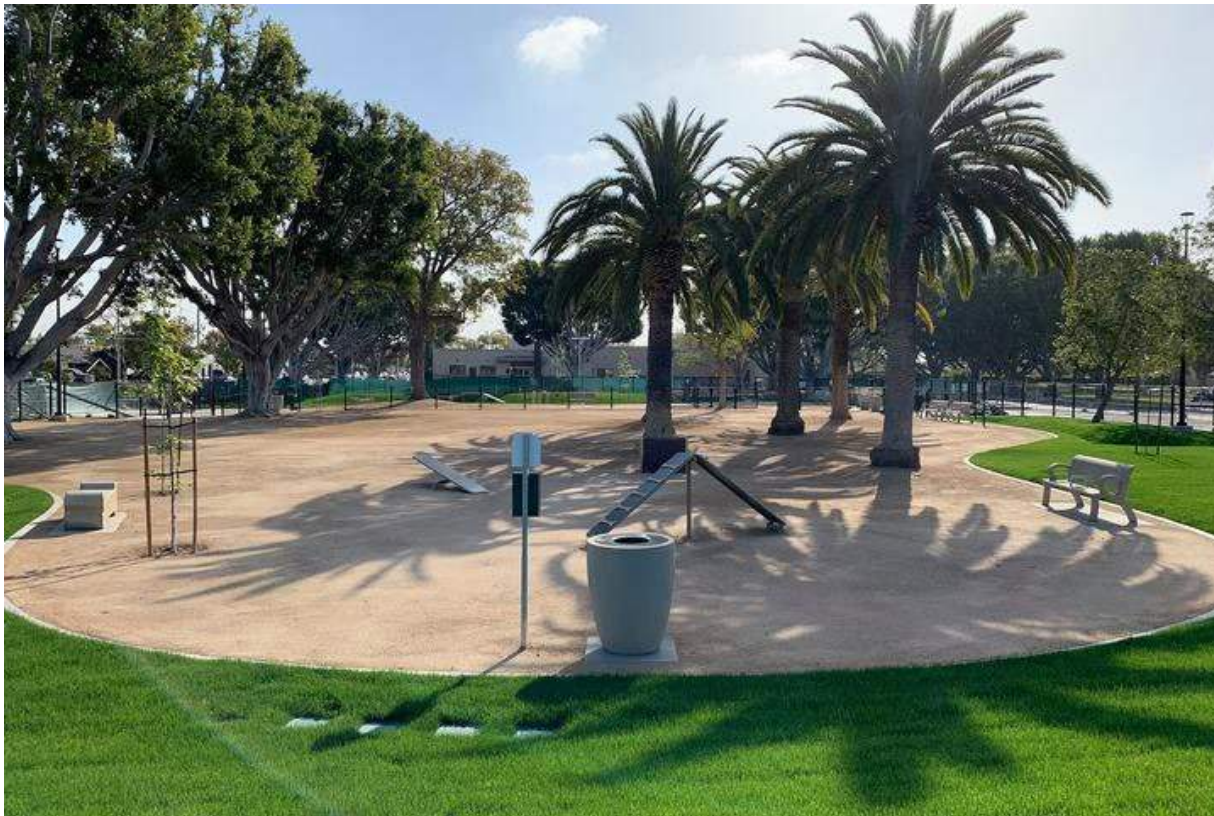
- Rubber Feet for Sheet Flow Drainage



Dog Parks

Surface Alternatives

- Unstabilized Decomposed Granite



2024 NATIONAL CONFERENCE | VICTORIA, BC | MAY 5-7, 2024

Dog Parks

Surface Alternatives

- Pea Gravel



Dog Parks

Surface Alternatives

- Irrigated Turfgrass
- Synthetic Turf



2024 NATIONAL CONFERENCE | VICTORIA, BC | MAY 5-7, 2024

Dog Parks

Turfgrass Challenges

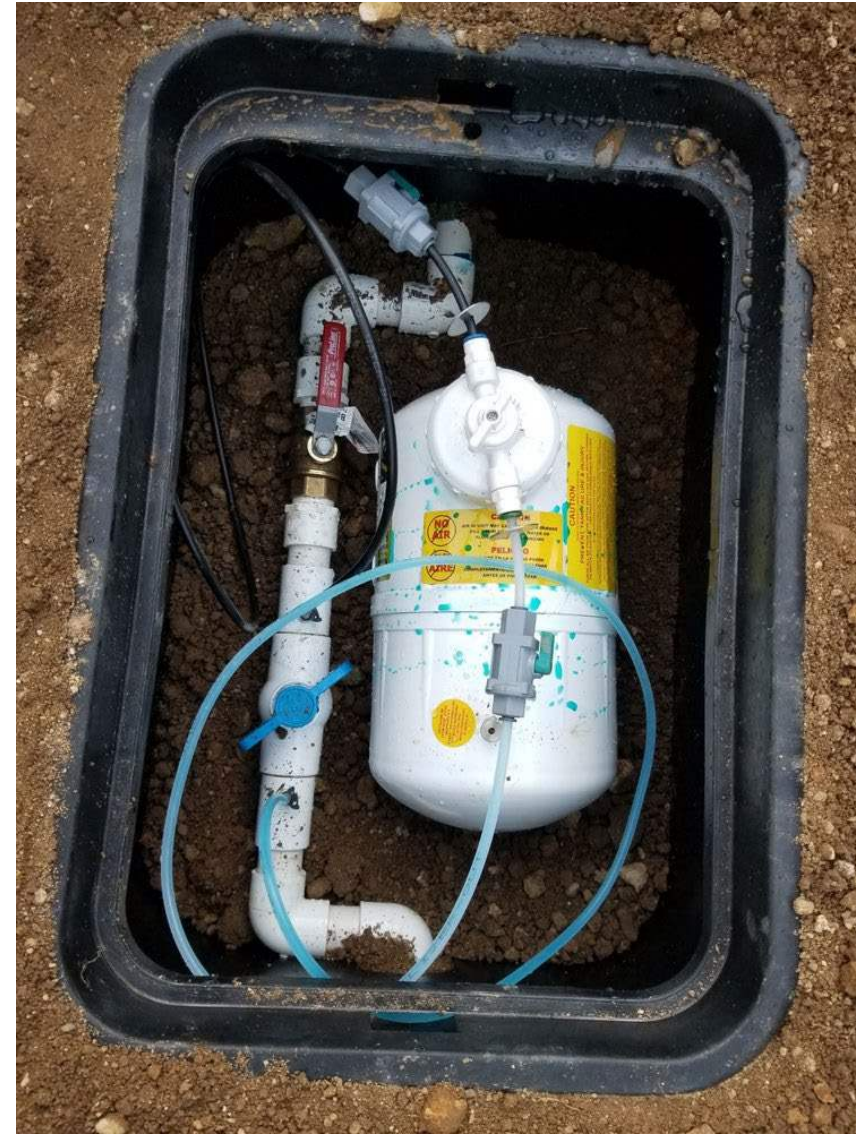
- Bermuda vs Bluegrass
- Nitrogen Management



Dog Parks

Turfgrass Maintenance

- Leaching
- Fertigation



2024 NATIONAL CONFERENCE | VICTORIA, BC | MAY 5-7, 2024

Dog Parks

Durability along Fencelines



2024 NATIONAL CONFERENCE | VICTORIA, BC | MAY 5-7, 2024