

# DESIGN AND PROPOSAL



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# AGENDA

- EVALUATE AND DRAFT SITE DATA
- IDENTIFY AND RESEARCH PLANT MATERIALS
- CALCULATE LANDSCAPE WATER REQUIREMENTS
- IDENTIFY RESTRICTIONS AND RESTRAINTS
- GROUP CONCEPTUAL DESIGNS
- CONSTRUCT IRRIGATION PLAN



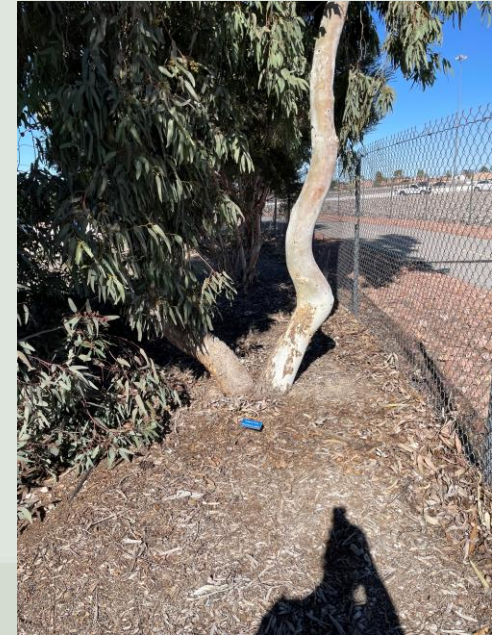
# EVALUATE SITE DATA

- UNR COOP EXTENSION
- 8050 PARADISE RD
- 89123
- SANDY LOAM
- METERED
- 1"
- STATIC PRESSURE ?
- TIE INTO EXISTING
- POC
- VISIBLE SITE PROBLEMS



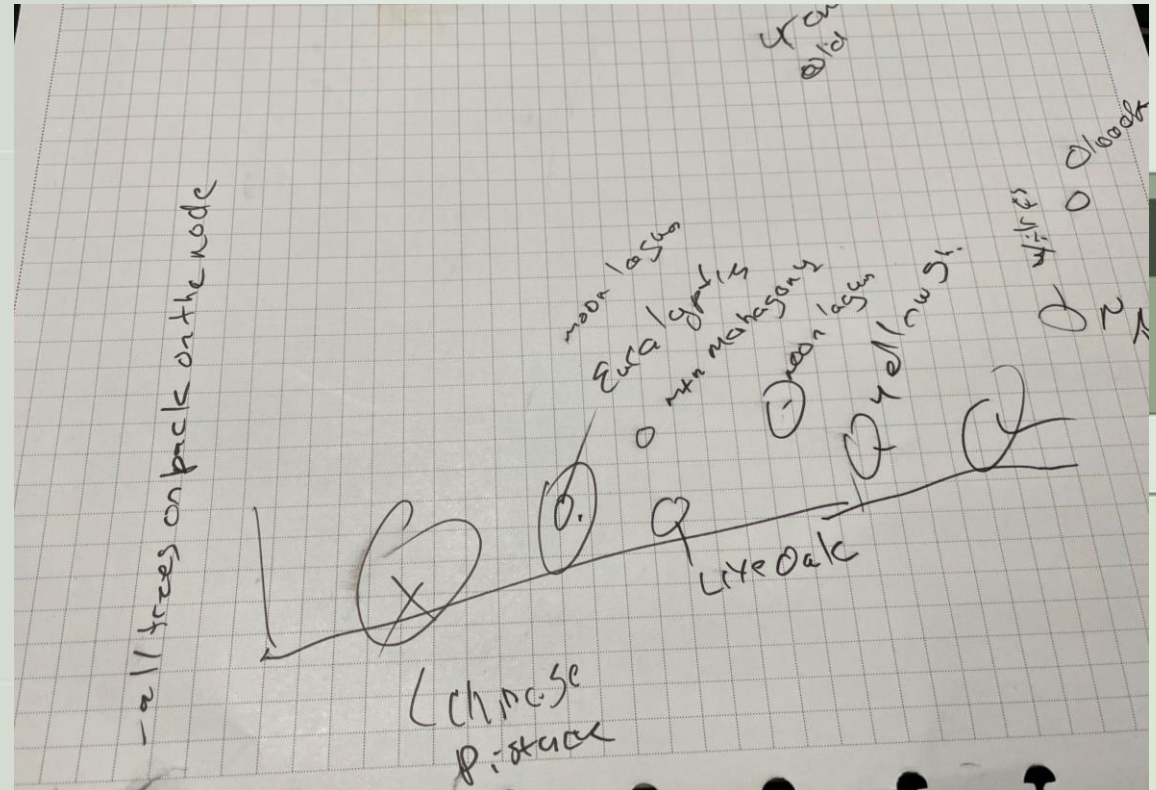
# EVALUATE SITE DATA

- VISIBLE SITE PROBLEMS















# EVALUATE SITE DATA

- FIELD NOTE SUMMARY
  - TREES AT THE NORTH PERIMETER – HUNTER NODE
  - SOIL LOOKS DAMP UNDER MULCH
  - TREES APPEAR STRESSED?



# DRAFT SITE DATA

PLANT SCHEDULE				
SYMBOL	BOTANICAL NAME	QTY	VALUE	TOTAL (SF)
	EUCALYPTUS CAMALDULENSIS	1	942	942
	AGAVE OVATIFOLIA	5	13	65
	CALLISTEMON VIOLACEA	1	50	50
	CERCOCARPUS MONTANUS	1	220	220
	QUERCUS TERBINELLA	1	28	28
	EUCALYPTUS LUNATA	2	125	250
	EUCALYPTUS LEUCOXYLON	1	368	368
	EUCALYPTUS SP. DWARF	1	125	125
	EUCALYPTUS SP.	1	368	368
	EUCALYPTUS VICTRIX	6	490	2940
	MELALEUCA HALMATURORUM	2	28	56
	NERIUM OLEANDER	2	177	354

MODERATE WATER USE PLANT MATERIALS COVERAGE = 942

LOW WATER USE PLANT MATERIALS COVERAGE = 4,824

TOTAL AREA = 4,853



# RESEARCH PLANT MATERIALS

- MODERATE WATER USE PLANT MATERIALS
  - *Eucalyptus camaldulensis*  
'Blue Veil'



# RESEARCH PLANT MATERIALS

## ■ LOW WATER USE PLANT MATERIALS

- *Agave ovatifolia*
- *Callistemon violacea*
- *Cercocarpus montanus*
- *Eucalyptus lunata*
- *Eucalyptus leucoxylon*
- *Eucalyptus sp. Dwarf*
- *Eucalyptus sp.*
- *Eucalyptus victrix*
- *Melaleuca halmaturorum*
- *Nerium oleander*
- *Quercus turbinella*





# RESEARCH PLANT MATERIALS

BOTANICAL / COMMON NAME	SIZE	QTY	UNIT	COVERAGE (SF)	TOTAL (SF)
MODERATE WATER USE PLANT MATERIAL					
EUCALYPTUS CAMALDULENSIS	EXISTING	1	ea	942	942
				TOTAL	942
LOW WATER USE PLANT MATERIALS					
AGAVE OVATIFOLIA	EXISTING	5	ea	13	65
CALLISTEMON VIOLACEA	EXISTING	1	ea	50	50
CERCOCARPUS MONTANUS	EXISTING	1	ea	220	220
QUERCUS TURBINELLA	EXISTING	1	ea	28	28
EUCALYPTUS LUNATA	EXISTING	2	ea	125	250
EUCALYPTUS LEUCOXYLON	EXISTING	1	ea	368	368
EUCALYPTUS SP. DWARF	EXISTING	1	ea	125	125
EUCALYPTUS SP.	EXISTING	1	ea	368	368
EUCALYPTUS VICTRIX	EXISTING	6	ea	490	2,940
MELALEUCA HALMATURORUM	EXISTING	2	ea	28	56
NERIUM OLEANDER	EXISTING	2	ea	177	354
				TOTAL	4,824
TOTAL PLANT MATERIAL COVERAGE MODERATE WATER USE (SF)					942
TOTAL PLANT MATERIAL COVERAGE LOW WATER USE (SF)					4,824

1. PLANTS NOT IN THE SNRPC PLANT LIST - LOOK AT REPUTABLE ONLINE SOURCES (.EDU'S .ORG'S) FOR WATER USE AND CANOPY WIDTHS
2. CALCULATE SQUARE FEET FROM CANOPY WIDTH
3. MULTIPLY QUANTITY BY COVERAGE
4. ADD THE VALUES OF THE MODERATE WATER USE
5. ADD THE VALUES OF THE LOW WATER USE

# LANDSCAPE WATER REQUIREMENTS

**Distribution Uniformity Low Quarter (DU\_LQ):** A measure of the average of the lowest quarter of samples, divided by the average of all samples expressed as percentage.

**Landscape Coefficient:** A factor used to modify ETo that factors in the different vegetation species planted.

**Ref Eto:** Reference Evapotranspiration

**Evapotranspiration (ET):** Water loss in the soil due to evaporation.

**Landscape Water Requirement (LWR):** Amount of water needed to maintain a given landscape type.

UNR COOPERATIVE EXTENSION LANDSCAPE WATER REQUIREMENTS										
Month	Plant Material Water Needs	1/.90 DU_LQ	Landscape Coefficient	Allowable Rainfall (25% of Average Peak)	Coverage (sf)	Conversion Factor (from in. to gallons)	Local Ref Eto (in/mo)	Landscape ET	LWR By Type (gallons)	Monthly LWR (gallons)
January	MODERATE	1.11	0.5	0.19	942	0.6233	3.63	1.63	1,061	2,858
	LOW		0.2		4,824			0.54	1,797	
February	MODERATE	1.11	0.5	0.20	942	0.6233	4.53	2.07	1,347	3,712
	LOW		0.2		4,824			0.71	2,365	
March	MODERATE	1.11	0.5	0.24	942	0.6233	6.31	2.92	1,903	5,331
	LOW		0.2		4,824			1.03	3,428	
April	MODERATE	1.11	0.5	0.06	942	0.6233	7.98	3.93	2,561	7,688
	LOW		0.2		4,824			1.54	5,126	
May	MODERATE	1.11	0.5	0.06	942	0.6233	10.48	5.18	3,376	10,171
	LOW		0.2		4,824			2.04	6,796	
June	MODERATE	1.11	0.5	0.02	942	0.6233	11.71	5.84	3,803	11,553
	LOW		0.2		4,824			2.32	7,750	
July	MODERATE	1.11	0.5	0.14	942	0.6233	11.60	5.66	3,690	10,975
	LOW		0.2		4,824			2.18	7,284	
August	MODERATE	1.11	0.5	0.23	942	0.6233	9.79	4.67	3,042	8,818
	LOW		0.2		4,824			1.73	5,776	
September	MODERATE	1.11	0.5	0.16	942	0.6233	8.30	3.99	2,602	7,617
	LOW		0.2		4,824			1.50	5,015	
October	MODERATE	1.11	0.5	0.07	942	0.6233	5.95	2.91	1,893	2,641
	LOW		0.2		4,824			1.12	748	
November	MODERATE	1.11	0.5	0.12	942	0.6233	3.49	1.63	1,061	1,448
	LOW		0.2		4,824			0.58	387	
December	MODERATE	1.11	0.5	0.12	942	0.6233	2.47	1.12	728	1,985
	LOW		0.2		4,824			0.38	1,257	
									ANNUAL TOTAL GALLONS	74,795

# LANDSCAPE WATER REQUIREMENTS

- USE A S.L.I.D.E (SIMPLIFIED LANDSCAPE IRRIGATION DEMAND ESTIMATION) ONLINE CALCULATOR

University of California, Division of Agriculture and Natural Resources

## Center for Landscape & Urban Horticulture



Mission

Environmental Horticulture Industry in California

Home Gardening

Pests And Weeds

US Hardiness Zone Map

Contact Information

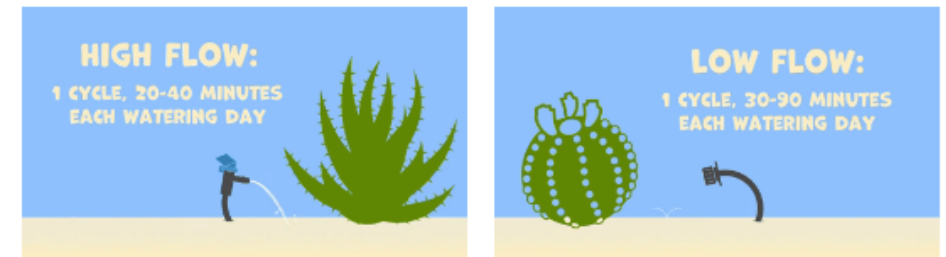
[https://ucanr.edu/sites/UrbanHort/Water Use of Turfgrass and Landscape Plant Materials/Water Demand Calculators/](https://ucanr.edu/sites/UrbanHort/Water%20Use%20of%20Turfgrass%20and%20Landscape%20Plant%20Materials/Water%20Demand%20Calculators/)

# RESTRICTIONS AND RESTRAINTS

- WHAT IS THE MOST RESTRICTIVE WATER WINDOW?
- HOW MANY ZONES WILL BE NEEDED?
- CAN WE ADD A STATION(S) TO THE EXISTING CONTROLLER?
- HOW MANY GPH WILL BE NEEDED?
- WHAT IS THE SIZE OF THE AREA (SF)

## How long to water

Determine the amount of time to water based on the rate of flow of your drip emitters.



Emitter type	Length of each watering
High-flow emitter (Up to 20 gph)	20 - 40 minutes or less
Low-flow emitter (Up to 4 gph)	30 minutes or less
Low-flow emitter (Up to 2 gph)	60 minutes or less
Low-flow emitter (Up to 1 gph)	90 minutes or less

# RESTRICTIONS AND RESTRAINTS

- WHAT IS THE MOST RESTRICTIVE WATER WINDOW?
  - SUMMER 6 DAYS A WEEK (NEVER ON SUNDAY)
  - BETWEEN 7:00PM – 11:00AM
  - 16 HOURS PER DAY AT 6 DAYS
    - 96 HOURS PER WEEK
    - 384 HOURS PER MONTH
      - 23,040 MINUTES



# RESTRICTIONS AND RESTRAINTS

- HOW MANY ZONES WILL BE NEEDED?
  - SHRUBS
  - TREES
  - AGAVES



# CONSTRUCT IRRIGATION PLAN

- CAN WE ADD A STATION(S) TO THE EXISTING CONTROLLER?
  - EXISTING BATTERY-OPERATED CONTROLLER

*\* NEXT WEEK WILL "LOOK" FOR CONTROL WIRE*



# RESTRICTIONS AND RESTRAINTS

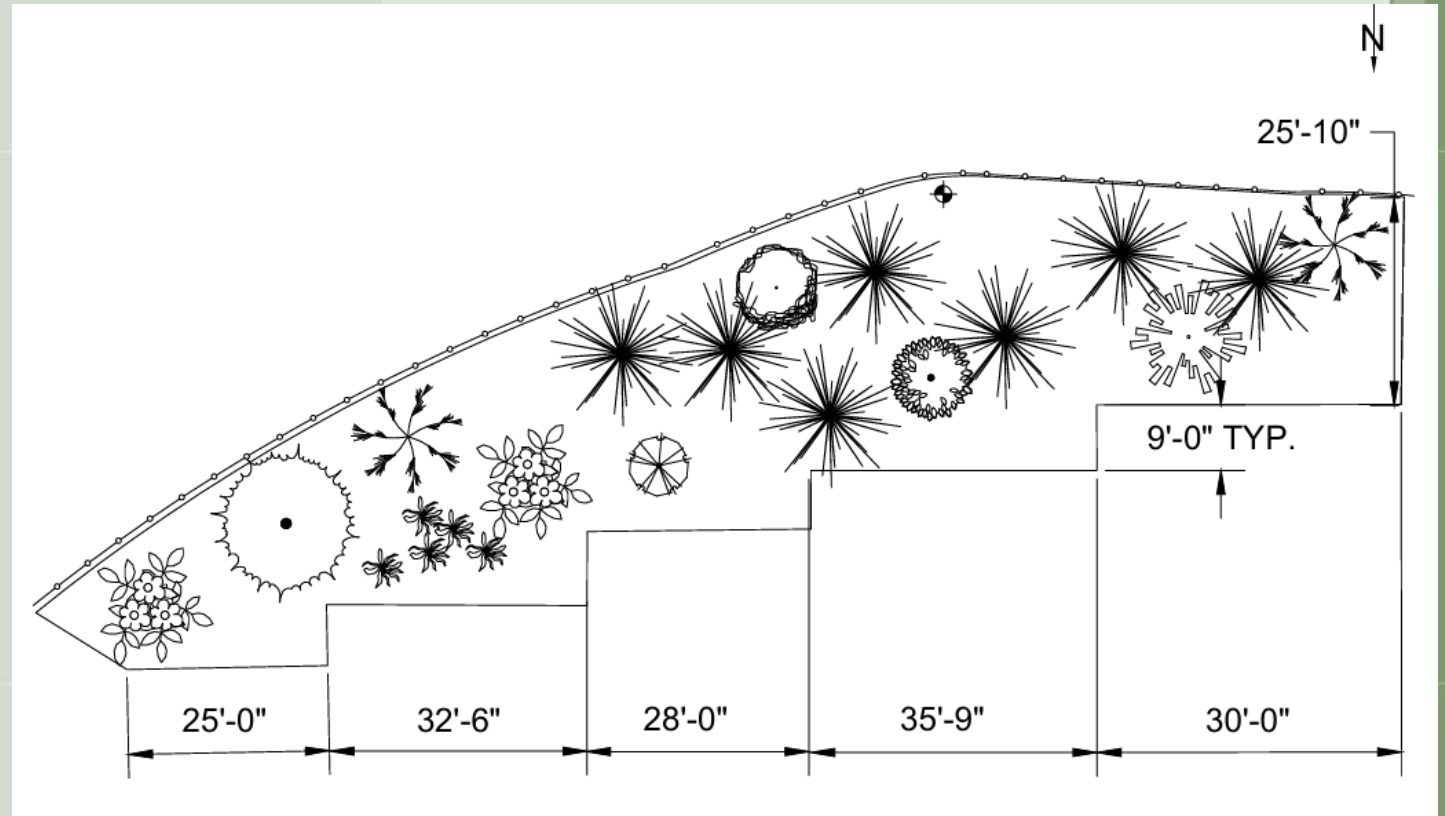
- HOW MANY GPH (GPM) WILL BE NEEDED?
- $11,553/384 = 30$  (H)
  - 30/4 (WEEKS IN A MONTH) = 7.5 (HOURS PER WEEK)
  - 7.5/ 6 (WATERING DAYS)=1 HOUR 15 MIN

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ANNUAL TOTAL GALLONS										74,795



# RESTRICTIONS AND RESTRAINTS

- WHAT IS THE SIZE OF THE AREA (SF)
  - 4,853 SF



# RESTRICTIONS AND RESTRAINTS

- RECOMMENDED EMITTER FLOW RATE
- RECOMMENDED EMITTER SPACING
- RECOMMENDED LATER SPACING

■ TABLE 2: XF SERIES DRIPLINE RECOMMENDATION TABLES

XF Series Dripline Recommendations (English)			
Soil Type	Clay	Loam	Sand
Emitter Flow Rate (gallons per hour)	0.4 GPH	0.6 GPH	0.9 GPH
Emitter Spacing (inches)	18"	18"	12"
Dripline Lateral Spacing (inches)	18" - 24"	16 - 22"	12" - 18"



# GROUP CONCEPTUAL DESIGN

- WITH YOUR SHOULDER PARTNER:
  - 1. CALCULATE THE ZONE REQUIREMENTS FOR THE ENTIRE AREA

# GROUP CONCEPTUAL DESIGN

## ■ ZONE REQUIREMENTS

XF Series Dripline Flow (per 100 feet)						
Emitter Spacing	0.4 GPH Emitter		0.6 GPH Emitter		0.9 GPH Emitter	
Inches	GPH	GPM	GPH	GPM	GPH	GPM
12"	42	0.70	61	1.02	92	1.53
18"	28	0.47	41	0.68	61	1.02

Maximum Flow Per Zone (English)					
Sch. 40 PVC or QF Header Size	Max. Flow* GPM	psi Loss**	Poly Pipe Header Size	Max. Flow* GPM	psi Loss**
½"	4.7 GPM	7.7 psi	½"	4.7 GPM	8.8 psi
¾"	8.3 GPM	5.6 psi	¾"	8.3 GPM	6.3 psi
1"	13.5 GPM	4.2 psi	1"	13.5 GPM	4.8 psi
1-¼"	23.1 GPM	3.1 psi	1-¼"	23.1 GPM	3.1 psi
1-½"	33.9 GPM	2.9 psi	1-½"	33.9 GPM	2.9 psi
2"	52.4 GPM	1.9 psi	2"	52.4 GPM	1.9 psi

## ■ WHAT IS THE TOTAL FLOW WITHIN THE DRIP ZONE?

$$\frac{\text{Irrigated Area in Sq Ft.} \times \text{Emitter Flow in GPH} \times 2.4}{\text{Lateral Row Spacing in Inches} \times \text{Emitter Spacing in Inches}}$$

### Example:

Irrigated Area	2500 Sq Ft
Emitter Flow Rate	0.6 GPH
Emitter Spacing	18 inches
Lateral Row Spacing	18 inches

$$\frac{2500 \times 0.6 \times 2.4}{18 \times 18} = 11.11 \text{ GPM}$$



# GROUP CONCEPTUAL DESIGN

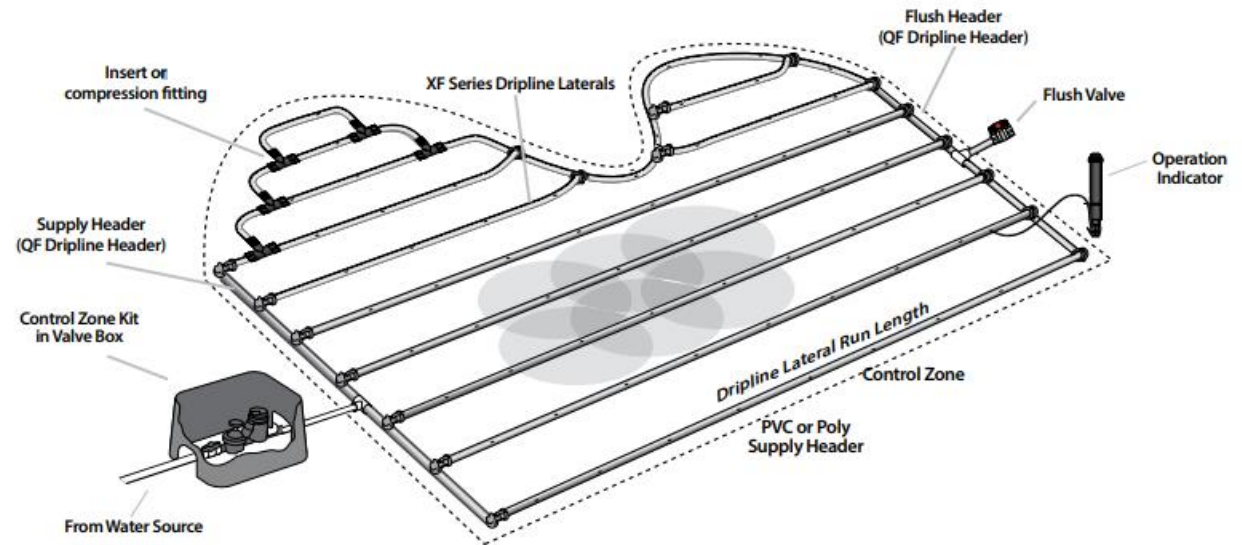
- WITH YOUR SHOULDER PARTNER:
  - 1. CREATE A CONCEPTUAL LAYOUT

# GROUP CONCEPTUAL DESIGN

## ■ DETERMINE LAYOUT

### ■ CURVED EDGE LAYOUT

The Curved Edge layout is primarily used for dense planting areas. The layout uses supply and flush headers with rows of dripline connected at the end. The supply and flush header form a continuous loop and the dripline can be attached to the adjacent driplines with "tee" fittings to accommodate curved applications.





# GROUP CONCEPTUAL DESIGN

- WITH YOUR SHOULDER PARTNER:
  - 1. CALCULATE THE APPLICATION RATE

# GROUP CONCEPTUAL DESIGN

## ■ APPLICATION RATE

### ■ HOW DO I DETERMINE THE APPLICATION RATE?

Emitter Spacing	Lateral Row Spacing (in Inches)										
	12"	13"	14"	15"	16"	17"	18"	19"	20"	22"	24"
<b>0.4 GPH Emitter Flow (Inches per hour)</b>											
12"	0.67	0.62	0.58	0.54	0.51	0.48	0.45	0.43	0.40	0.37	0.34
18"	0.45	0.41	0.39	0.36	0.34	0.32	0.30	0.28	0.27	0.25	0.22
<b>0.6 GPH Emitter Flow (Inches per hour)</b>											
12"	0.96	0.89	0.83	0.77	0.72	0.68	0.64	0.61	0.58	0.53	0.48
18"	0.64	0.59	0.55	0.51	0.48	0.45	0.43	0.41	0.39	0.35	0.32
<b>0.9 GPH Emitter Flow (Inches per hour)</b>											
12"	1.44	1.33	1.24	1.16	1.08	1.02	0.96	0.91	0.87	0.79	0.72
18"	0.96	0.89	0.83	0.77	0.72	0.68	0.64	0.61	0.58	0.53	0.48

Emitter Flow Rate in GPH x 231.1

Lateral Row Spacing in Inches x Emitter Spacing in Inches

#### **Example:**

Emitter Flow Rate                      0.6 GPH  
 Emitter Spacing                        12 inches  
 Lateral Row Spacing                  18 inches

$$\frac{0.6 \times 231.1}{12 \times 18} = 0.64 \text{ inches/hour}$$



# CONSTRUCT IRRIGATION PLAN

