Commercial Site Assessment™ Tier II

Prepared for:

Cedar Landing

20991 Goodhue Way
Lakeville, MN 55044

2020 Season

conserva® irrigation

Proud Partner of TORO®

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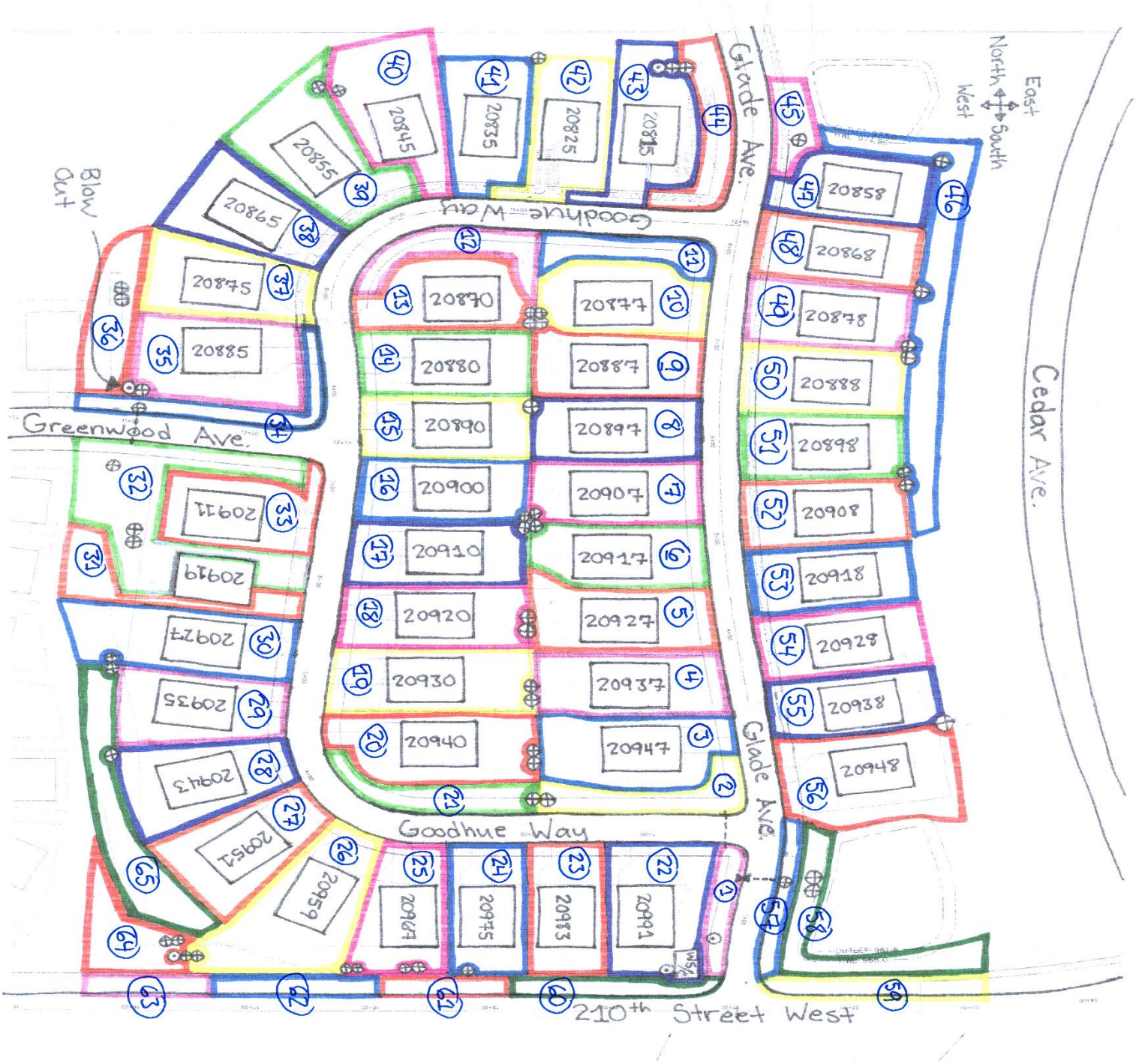
Cedar Landing

Cedar Landing Zones Map



Cedar Landing Irrigated Area

Commercial Site Assessment™

Date of Tier I CSA: August 28th, 2020
Certified Technician: Garret Peterson, CLIA, CIT

Date of Tier II CSA: August 28th, 2020
Certified Technician: Garret Peterson, CLIA, CIT

Irrigated Acres: 8.24
Irrigated ft^2: 358,762.27 ft^2

Audit Observations

The onsite irrigation system controller is a Rainbird IQ Smart Controller with 65 zones. This controller is a smart controller (weather based) that is capable of remote monitorization, which is ideal for water savings.

There were some rotors in zones that had the wrong nozzle size installed for their area of coverage. Nozzles of rotors should change depending on area of coverage. For example, if a head covers 90° the nozzle will be a 1.5, a head covering 180° is a 3.0 nozzle, 270° head should be a 4.0 (no 4.5 manufactured), and 360° head should be a 6.0. If all nozzles are the same and the heads turn at a fixed rate, then areas covered by a 90° head will get more water and those covered by a 360° head will get too little.

Solution:

- Installing new nozzles of the correct size.

There are also zones that have poor coverage/spacing. Spray zones along the boulevards are over spraying onto the road to make up for poor spacing and single line uniformity. The pressure on the spray zone was also exceedingly high.

Solutions:

- Moving every other head to the other side and changing nozzles.
- Installing pressure regulated heads to compensate for high pressure misting.

Zones 22, 59, and 60 have single line uniformity and poor coverage of the areas they irrigate, leading to dry spots.

Solution:

- Adding an opposing line of coverage and swapping nozzles on existing zones would provide better, more even, and efficient coverage.

Some zones are behind silt fences, native areas, or in inefficient locations for the coverage needed.

Solution:

- Move heads to turf or to new locations that increase coverage of irrigation.

System Audit Observations Continued

There were Hunter MP rotary nozzle sprays with the wrong nozzle for coverage needed. MP nozzles come in a variety of sizes and coverage ranges.

Solution:

- Change the incorrect MP nozzle with the correct MP nozzle for area of coverage.

Some rotors were crooked, too low, etc. and need to have their position in the ground adjusted for proper coverage. If a rotor is not set in the ground correctly, the throw from the head can go from 30’ to 10’ when crooked. Even worse, if a head is too low it hits all the grass immediately around the head and throws off the distribution.

Solution:

- Reset head in the ground to the correct orientation.

There was also a potential mainline leak or lateral line leak behind 20920. We noticed a very wet spot by a valve box down the hill a little bit behind that house.

Solution:

- Investigate area for source of excess water, repair if needed.

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Water Rates:

Meter Reading Interval: ☐ Monthly ☒ Quarterly ☐ Other _____

Units Measured As: ☒ 1000 gallons ☐ CCF

Converted Units: ☒ 1 unit = 1000 gallons

WATER RATES	Irrigation Metered System
Price per unit (per 1,000 gals)	$5.64
Threshold per quarter	Irrigation Metered System
Sewer Rate per unit (if unmetered):	Does not apply

Historical Water Usage:

Year	Annual Water Usage (gallons)	Annual Water Cost*
2016[!]	3,408,000	$19,221.12
2017[!]	3,763,000	$21,223.32
2018	3,941,000	$22,227.24
2019	966,000	$5,448.24
4 Year Average	3,019,500	$17,029.98

*Current Water rates used for best comparison year to year and for future expectations.

Plant Water Requirement (ET Data & Average Effective Rainfall):

Plant Material: **2,027,986 gallons** Cost: **$11,438 /year**

$$Eff\ \% = \frac{water\ need}{water\ use} \qquad Eff\ \% = \frac{2{,}027{,}986}{3{,}019{,}500} = \mathbf{67\%}$$

Minimum EPA efficiency standard = **75%**

Water Usage Goals:

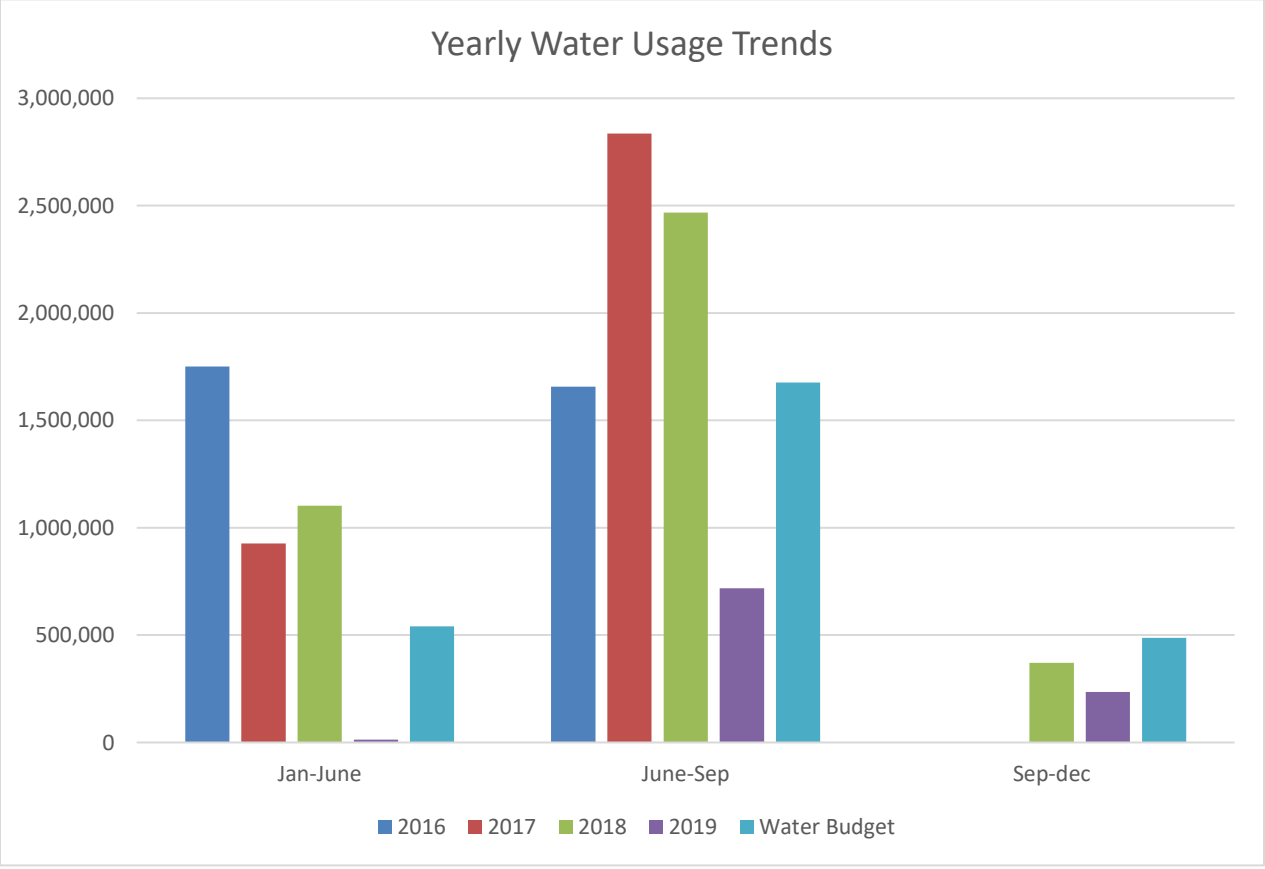
$Eff = 75\%$: 2,703,981 gallons used at an annual cost of **$15,250**

$Eff = 85\%$: 2,385,865 gallons used at an annual cost of **$13,456**

$Eff = 95\%$: 2,134,722 gallons used at an annual cost of **$12,040**

Water Budgeting

Month	2016 Usage	2017 Usage	2018 Usage	2019 Usage	Avg Usage	Water Budget
Jan-June	1,751,000	927,000	1,103,000	0	945,250	540,796
July-Sept	1,657,000	2,836,000	2,467,000	731,000	1,922,750	1,676,468
Sept-Dec	0	0	371,000	235,000	151,500	486,717
Total(gal)	**3,408,000**	**3,763,000**	**3,941,000**	**966,00**	**3,019,500**	**(75%eff)2,703,981**



System Components:

Water Source				Deficiency?
#1	Location	20991 Glade Ave		
	Source	City 4”		
	Anti-syphon			
		Brand	Wilkins Zurn - 975XL	
		Size	2”	
		Inspection Date	6/2020	
		Visual Inspection	Good Condition, no leaks	
	Deduct Meter			
		Brand	Neptune – T10	
		Size	2”	
		Serial Number	60874189	
		Reading	14,224,026.9 Gallons	
		Visual Inspection	Good Condition	
	Booster Pump			
		Brand	Muro	
		Size	3 horse	
		Master Valve	1 phase	
		Visual Inspection	Good, No Pressure Regulation*	
	Notes:	No Master Valve		

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Recommended Critical Repairs and Adjustments

	Zones																					
Head Type	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***	***12***	***13***	***14***	***15***	***16***	***17***	***18***	***19***	***20***	***21***	***Total***
Total # Rotors	16	15	12	11	17	15	9	11	8	14	8	11	11	16	9	13	21	21	17	17	14	**286**
Total # Sprays									3													**3**
Rotating Nozzles	3	2	5	11	3	5	1	14	13	5	4	4	4	5	11	11	2	1	5	3		**112**
Mini Rotors																						
High Pop Rotors																						
6" Sprays																						
12" High Pop Sprays																						
Mixed Head Types									X													
Zone GPM	58	60	80	60	70	50	60	60	78	56	64	74	70	52	50	20	74	78	74	76	54	-
Repairs	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***	***12***	***13***	***14***	***15***	***16***	***17***	***18***	***19***	***20***	***21***	***Total***
Damaged Rotors						1				1				1				1	1	1	1	**7**
Damaged 4" Sprays																						
Damaged 6" Sprays																						
Damaged High Pop Rotor																						
Damaged High Pop Spray																						
Line Leaks																						
Wrong Nozzles Sizing															1							**1**
Damaged Nozzles																						
Raise/Straighten Heads					1																	**1**
Design Changes	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***	***12***	***13***	***14***	***15***	***16***	***17***	***18***	***19***	***20***	***21***	***Total***
Move a head for better coverage					2				2						4							**8**
Add a head for better coverage			1												1				1			**3**
Cap unneeded head																						
Mixed Micro-Climates																						
Poor coverage/spacing																						
Zone Notes								1.)							2.)							

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	Zones																					
Head Type	***22***	***23***	***24***	***25***	***26***	***27***	***28***	***29***	***30***	***31***	***32***	***33***	***34***	***35***	***36***	***37***	***38***	***39***	***40***	***41***	***42***	***Total***
Total # Rotors	5	10	11	10	21	18	19	16	7	14	17	9	18	6	7	6	17	14	15	16	12	**268**
Total # Sprays																						
Rotating Nozzles	9	11	17	14	7	-	5	14	12	12	4	15	4	16	12	12	3	15	10	10	10	**212**
Mini Rotors																						
High Pop Rotors																						
6" Sprays																						
12" High Pop Sprays																						
Mixed Head Types																						
Zone GPM																						-
Repairs	***22***	***23***	***24***	***25***	***26***	***27***	***28***	***29***	***30***	***31***	***32***	***33***	***34***	***35***	***36***	***37***	***38***	***39***	***40***	***41***	***42***	***Total***
Damaged Rotors																						
Damaged 4" Sprays																						
Damaged 6" Sprays																						
Damaged High Pop Rotor																						
Damaged High Pop Spray																						
Line Leaks																						
Wrong Nozzles Sizing																		3				**3**
Damaged Nozzles			2									1										**3**
Raise/Straighten Heads						2															2	**4**
Design Changes	***22***	***23***	***24***	***25***	***26***	***27***	***28***	***29***	***30***	***31***	***32***	***33***	***34***	***35***	***36***	***37***	***38***	***39***	***40***	***41***	***42***	***Total***
Move a head for better coverage		1	1	1						2			1						2		1	**9**
Add a head for better coverage				1								1										**2**
Cap unneeded head		1	1											2							1	**5**
Mixed Micro-Climates																						
Poor coverage/spacing												X										
Zone Notes	3.)																					

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	Zones																					
Head Type	***43***	***44***	***45***	***46***	***47***	***48***	***49***	***50***	***51***	***52***	***53***	***54***	***55***	***56***	***57***	***58***	***59***	***60***	***61***	***62***	***63***	***Total***
Total # Rotors	9	12		1	12	7	14	16	14	19	14	12	11	5		16			17		17	**196**
Total # Sprays															21							**21**
Rotating Nozzles	11	7	6	20	10	12	15	4	6	10	14	14	7	24			20	32		30		**242**
Mini Rotors																						
High Pop Rotors																						
6" Sprays																						
12" High Pop Sprays																						
Mixed Head Types																						
Zone GPM																						-
Repairs	***43***	***44***	***45***	***46***	***47***	***48***	***49***	***50***	***51***	***52***	***53***	***54***	***55***	***56***	***57***	***58***	***59***	***60***	***61***	***62***	***63***	***Total***
Damaged Rotors																				1		**1**
Damaged 4" Sprays																						
Damaged 6" Sprays																						
Damaged High Pop Rotor																						
Damaged High Pop Spray																						
Line Leaks																						
Wrong Nozzles Sizing																						
Damaged Nozzles														1	2			1				**4**
Raise/Straighten Heads					1								1									**2**
Design Changes	***43***	***44***	***45***	***46***	***47***	***48***	***49***	***50***	***51***	***52***	***53***	***54***	***55***	***56***	***57***	***58***	***59***	***60***	***61***	***62***	***63***	***Total***
Move a head for better coverage	3						1			1	2	3										**10**
Add a head for better coverage					1						3		2									**6**
Cap unneeded head								1														**1**
Mixed Micro-Climates																						
Poor coverage/spacing																						
Zone Notes			4.)												5.)		6.)	7.)		8.)	9.)	

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	Zones		
Head Type	***64***	***65***	***Total***
Total # Rotors	5	13	**18**
Total # Sprays			
Rotating Nozzles			
Mini Rotors			
High Pop Rotors			
6" Sprays			
12" High Pop Sprays			
Mixed Head Types			
Zone GPM			
Repairs	***64***	***65***	***Total***
Damaged Rotors			
Damaged 4" Sprays			
Damaged 6" Sprays			
Damaged High Pop Rotor			
Damaged High Pop Spray			
Line Leaks			
Wrong Nozzles Sizing			
Damaged Nozzles			
Raise/Straighten Heads			
Design Changes	***64***	***65***	***Total***
Move a head for better coverage			
Add a head for better coverage			
Cap unneeded head			
Mixed Micro-Climates			
Poor coverage/spacing			
Zone Notes	Zone Doesn't Need Pump		

Zone Note By Number	Description
1.)	Zone 8 change front yard 1000 and 2000 MP rotary nozzles to 3000 MP Rotary nozzles for more distance/coverage.
2.)	Zone 15 convert MP along street to a rotor for full coverage. MPs do not throw far enough to fill the same role as a rotor.
3.)	Zone 22 add apposing line of heads (~8 MP) to boulevard.
4.)	Zone 45 most of this zone was capped off. The line was sticking out of ground to show where it was capped but it is also leaking. Make sure pump is disabled.
5.)	Zone 57 sprays heads need to be changed to pressure regulated heads. Current heads are wasting water through misting (evaporation out of nozzle). Also, zone does not have capacity to add apposing line of heads, instead move half the heads to the other side for triangulated coverage. This will improve coverage and reduce throw into street.
6.)	Zone 59 add apposing line of MP heads (~19). Zone is an MP zone and has capacity for more heads.
7.)	Zone 60 add apposing line of MP heads (~31). Zone is an MP zone and has capacity for more heads.
8.)	Zone 62 add apposing line of MP heads (~29). Zone is an MP zone and has capacity for more heads.
9.)	Zone 63 should not be a zone that is run through the irrigation system. Area that it irrigates is not maintained turf and is a waste of water.

Critical Repairs and Adjustments

Repairs	Price (each)	Count		Total
1R.) Installed 5" Rotor	$ 65.00	8		$ 520.00
2R.) Broken/Clogged Spray Nozzles	$ 20.00	7		$ 140.00
3R.) Move Head (per foot)	$ 15.00	25 heads moved for a total of 173'		$ 2,595.00
4R.) Cap Head/line	$ 35.00	6		$ 210.00
5R.) Mainline potential leak (T&M)	$ 85.00 per hour + materials	1		$ -
				$ 3,465.00

Recommended Efficiency Upgrades

System Efficiency and Design Upgrades	Price (each)	Count	Total
1U.) Zone 22 add opposing line of 8 MPs.	$ 450.00	1	$ 450.00
2U.) Zone 57 move half of the sprays to opposite side for better coverage (triangulated) and swap heads to pressure regulated heads to eliminate misting (water waste).	$ 1,200.00	1	$ 1,200.00
3U.) Zone 59 add opposing line of MPs (~19) for best coverage that will reduce overthrown wasted water and greener grass due to increased coverage.	$ 950.00	1	$ 950.00
4U.) Zone 60 add opposing line of MPs (~31) for best coverage that will reduce overthrown wasted water and greener grass due to increased coverage.	$ 1,550.00	1	$ 1,550.00
5U.) Zone 62 add opposing line of MPs (~29) for best coverage that will reduce overthrown wasted water and greener grass due to increased coverage.	$ 1,450.00	1	$ 1,450.00
6U.) Install correct Hunter MP™ Rotary Nozzles for spacing.	$ 25.00	4	$ 100.00
7U.) Raise / Straighten Heads.	$ 15.00	7	$ 105.00
			$ 5,805.00

In summary, completing the recommended critical repairs and upgrades will result in substantially more efficient water usage and healthier plant material.

Next Steps:

- ☐ Fix critical repair issues
- ☐ Cap unneeded heads
- ☐ Add heads for improved coverage on some zones
- ☐ Update rotor head nozzles or replace head to match individual coverage areas
- ☐ Addressing coverage/spacing issues on boulevard spray zones
- ☐ Annually maintain and monitor property