



STANDING ADVISORY COMMITTEE AGENDA

Tuesday, February 4, 2020 at 3:00 p.m.
Truckee Meadows Water Authority
Independence Meeting Room
1355 Capital Boulevard, Reno, NV 89502

NOTES:

1. The announcement of this meeting has been posted at the following locations: Truckee Meadows Water Authority (1355 Capital Blvd., Reno), Reno City Hall (1 E. First St., Reno), Sparks City Hall (431 Prater Way, Sparks), Sparks Justice Court (1675 E. Prater Way, Sparks), Washoe County Courthouse (75 Court St., Reno), Washoe County Central Library (301 South Center St., Reno), Washoe County Administration (1001 East Ninth St., Reno), at <http://www.tmtwa.com>, and State of Nevada Public Notice Website, <https://notice.nv.gov/>.
2. In accordance with NRS 241.020, this agenda closes three working days prior to the meeting. We are pleased to make reasonable accommodations for persons who are disabled and wish to attend meetings. If you require special arrangements for the meeting, please call 834-8002 at least 24 hours before the meeting date.
3. Staff reports and supporting material for the meeting are available at TMWA and on the TMWA website at <http://www.tmtwa.com/meeting/> or you can contact Sonia Folsom at (775) 835-8002. Supporting material is made available to the general public in accordance with NRS 241.020(6).
4. The Committee may elect to combine agenda items, consider agenda items out of order, remove agenda items, or delay discussion on agenda items. Arrive at the meeting at the posted time to hear item(s) of interest.
5. Asterisks (*) denote non-action items.
6. Public comment is limited to three minutes and is allowed during the public comment periods. The public may sign-up to speak during the public comment period or on a specific agenda item by completing a "Request to Speak" card and submitting it to the clerk. In addition to the public comment periods, the Chairman has the discretion to allow public comment on any agenda item, including any item on which action is to be taken.
7. In the event the Chairman and Vice-Chairman are absent, the remaining SAC members may elect a temporary presiding officer to preside over the meeting until the Chairman or Vice-Chairman are present (**Standing Item of Possible Action**).

1. Roll call*
2. Public comment — limited to no more than three minutes per speaker*
3. Approval of the agenda (**For Possible Action**)
4. Approval of the minutes of December 3, 2019 meeting (**For Possible Action**)
5. Presentation on the decline in tree canopy in the area — Matt Basile, Urban Forester*
6. Water Supply Update — Bill Hauck*
7. Presentation of Financial Performance for Second Quarter Fiscal Year 2020 — Matt Bowman*
8. Presentation of different watering advancements and technology — Laine Christman*
9. Discussion and possible direction to staff regarding agenda items for future meetings (**For Possible Action**)

10. Staff Items* (Unless otherwise listed with a topic description, this portion of the agenda is limited to announcements)
11. Committee Items* (Unless otherwise listed with a topic description, this portion of the agenda is limited to announcements)
12. Public Comment — limited to no more than three minutes per speaker*
13. Adjournment (**For Possible Action**)



STANDING ADVISORY COMMITTEE

DRAFT MINUTES

December 3, 2019

The Standing Advisory Committee (SAC) met at Truckee Meadows Water Authority (TMWA) in the Independence Room, 1355 Capital Blvd., Reno, Nevada. Chair McGuire called the meeting to order at 3:02 p.m.

1. ROLL CALL

Primary Members and Voting Alternates Present: Robert Chambers, Harry Culbert, Jordan Hastings, Colin Hayes, Don Kowitz, Carol Litster, Neil McGuire, Ken McNeil, Mike Schulewitch, and Jerry Wager.

Alternates Present: Fred Arndt, Ken Becker, Karl Katt, Bruce Gescheider, Susan Hoog, Dale Sanderson, and Jonnie Pullman.

Primary Members and Alternates Absent: Bill Hughes, Scot Munns, Ann Silver, Fred Schmidt and Jim Smith.

Staff Present: Matt Bowman, Robert Charpentier, Laine Christman, John Enloe, Scott Estes, Sonia Folsom, Mark Foree, Andy Gebhardt, Danny Rotter, Sandra Tozi, John Zimmerman, and Legal Counsel Michael Pagni (McDonald Carano).

2. PUBLIC COMMENT

There was no public comment.

3. APPROVAL OF THE AGENDA

Upon motion duly made by Member Schulewitch, and seconded by Member Hayes, and carried by unanimous consent of the members present, the Committee approved the agenda.

4. APPROVAL OF THE MINUTES OF THE OCTOBER 1, 2019 MEETING

Upon motion duly made by Member Schulewitch and seconded by Member Hayes, and carried by unanimous consent of the members

present, the Committee approved the October 1, 2019 meeting minutes.

5. PRESENTATION OF TMWA'S FISCAL YEAR 2019 CUSTOMER SATISFACTION STUDY

Andy Gebhardt, TMWA Director of Operations & Water Quality, presented on the FY 2019 Customer Satisfaction Study.

6. PRESENTATION ON THE COMPREHENSIVE ANNUAL FINANCIAL REPORT FOR FISCAL YEAR ENDED JUNE 30, 2019

Matt Bowman, TMWA Financial Controller, presented the Comprehensive Annual Financial Report (CAFR) for Fiscal Year ended June 30, 2019. The audit, which was completed by Eide Bailly, went well with no findings, comments or audit adjustments. Mr. Bowman credited Sandra Tozi, TMWA Senior Accountant, with preparing the majority of the documentation for the auditors.

Chair McGuire commended staff's efforts for there to be no findings, which is a great accomplishment.

7. PRESENTATION OF FINANCIAL PERFORMANCE FOR FIRST QUARTER FISCAL YEAR 2020

Mr. Bowman presented the Financial Performance for First Quarter Fiscal Year 2020. The first quarter results indicate: water sales revenue and operating expenses are down from budget, \$1.4m and \$2.0m respectively; change in net position was \$4.2m higher than budget, due primarily to higher capital contributions; non-operating expenses were \$0.5m lower due to higher investment income of \$0.7m; interest expense was lower due to principal payments during the last year (approximately \$9.3m); capital contributions were \$3.0m higher than budget, which was driven by a higher volume of developer contributions leading up to the fee increase which took place on October 1st; capital spending was approximately \$8.2m; and cash on hand was \$212.4m or \$14.6m higher than the beginning of the year (\$155.5m unrestricted cash to meet operating & maintenance expenses, principal & interest payments and construction projects, and \$56.9m restricted cash to pay for scheduled bond principal and interest payments).

8. PRESENTATION ON INTERIM LEGISLATIVE SESSION ACTIVITIES

John Zimmerman, TMWA Water Resources Manager, updated the Committee on Interim Legislative Session activities and that TMWA's Legislative Subcommittee has met once on November 1 to review bills of interest to TMWA: AB30 (3M, monitoring, mitigation and management of large water projects), AB62 (Proof of completion and proof of beneficial use), and SB207 (all public works projects require apprentices for 10% and 3% of total hours for vertical and horizontal construction, respectively).

The Committee discussed the impact of SB207 to TMWA and how it would be implemented. Staff explained they are working closely with the Labor Commissioner to minimize delays prior to January 1, 2020 implementation date.

9. PRESENTATION OF ANALYSIS OF TMWA RULE 7 WATER DEMAND ESTIMATES AND DISCUSSION AND POSSIBLE ACTION AND RECOMMENDATION TO THE BOARD ON POTENTIAL FUTURE CHANGES TO RULE 7 DEMAND ESTIMATES

John Zimmerman, TMWA Water Resources Manager, and Laine Christman, TMWA Resource Economist & Conservation Supervisor, presented this staff report. Mr. Zimmerman stated factors considered in TMWA Rule 7 demand estimate are as follows: for single-family residence (square footage of lot size), multi-family residence (number of units), irrigation (type of vegetation and how much), and commercial (based on best available data); and the State Engineer approved the changes. Mr. Zimmerman added the Board approved staff's recommendation to move forward with public outreach and to bring any comments to the Board in December; staff has presented to the Board at its October meeting, conducted a public workshop and presented to the Builders Association of Northern Nevada (BANN) on November 12; and anticipate to have the First Reading in January followed with the Second Reading in February. Also, staff recommended limiting allocations using TMWA's Inventory of water rights to 100 acre-feet per application unless approved by the General Manager.

Mr. Christman presented the analysis: the change to the demand estimates stemmed from the fact that in the past several years, water usage data for single-family and multi-family customers show a statistically distinct downward pattern of water use on average; a total of approximately 241 acre feet (AF) underutilization of water rights dedicated for single-family use for all lot sizes in the studied services. The proposed estimation, per the Truckee River Operating Agreement (TROA), includes an 11% drought factor, will yield more efficient allocation of resources, which will require less water rights to be dedicated and will lower total cost of housing in the area.

At this time Committee members inquired about whether there would be any cost savings to developers (yes, savings would be around \$500-1000 depending on lot size for single-family residences); the rule change would help off-set a portion of the increase in WSF fees; and existing customers would not be affected, only new customers.

Upon motion duly made by Member Hayes and seconded by Member Kowitz, and carried by unanimous consent of the members present, the Committee approved recommending to the Board the proposed changes to Rule 7 water demand estimates.

10. UPDATE ON VERDI AND STONEGATE DEVELOPMENTS

Scott Estes, TMWA Director of Engineering, and John Enloe, Director of Natural Resources, provided an update on the Verdi and Stonegate developments.

At this time, Stonegate has submitted an application for the booster pump station, which will be designed and constructed by TMWA with a \$250,000 engineering advance; currently, TMWA is in final review of the off-site pipeline between the Stead tanks and Stonegate; Stonegate will pay for all on- and off-site improvements and will pay TMWA's Area 10 Fee for all water demand as metered services are added, but will not pay TMWA's Supply-Treatment Fee since it will dedicate Fish springs resources for the project; upon completion, TMWA will own, operate and maintain the facilities and cost of operation and maintenance is paid through customer water rates; in July 2018, TMWA, Washoe County and Stonegate entered into a memorandum of understanding (MOU) to participate in the development and implementation of a pilot demonstration project to determine the feasibility of utilizing State of Nevada Category A+ advanced purified water at Stonegate (if successful, it may be a future alternative reclaimed water system serving Stonegate with water sourced from the Cold Springs Water Reclamation Facility); and Stonegate and TMWA worked together to submit a Special Use Permit (SUP) application to the City of Reno and to the United States Forest Service to allow construction of equalization tanks (the Reno tank SUP was appealed to the Reno City Council due to growth related concerns with stormwater, flooding and wastewater. The appeal will be reconsidered at Reno on December 4th).

At this time, TMWA has completed construction of the 18" Verdi Main Extension project and is currently serving the Riverbelle Mobile Home Park; the expansion of water service in Verdi is dependent on the completion of the remaining Verdi Backbone Facilities (approximately \$15m of improvements); TMWA is finalizing the design of the Boomtown Intertie project (which includes crossing the railroad tracks and a new booster pump station), and will go to bid in Feb/Mar 2020 and be in-service early 2021; the Washoe County School District (WCSD) has awarded a contract to extend the Verdi Water Main to the Verdi Elementary School; TMWA is working with the State Engineer on a local groundwater model to estimate the sustainable yield of the groundwater resource supplied by the Boomtown wells; once completed, the Boomtown Intertie project (2021) will allow for conjunctive use of surface water and local groundwater, further increasing water supply reliability.

11. UPDATE ON STANDING ADVISORY COMMITTEE MEMBERSHIP

Sonia Folsom, TMWA Standing Advisory Committee Liaison, referred to the Committee Membership List, which identified the Committee Members whose terms were expiring on December 31, 2019. Ms. Folsom stated of the 21 current members, six have terms that are expiring and reported all members, pending the reappointments made by the Builders Association of Northern Nevada (BANN) and a new appointment by the Reno-Sparks Chamber of Commerce, would continue.

Staff's proposed SAC membership will be presented to the TMWA Board for approval will be:

- Fred Schmidt, Wholesale Customer primary representative
- Jonnie Pullman, Multi-family Customer alternate representative
- Colin Hayes, BANN primary representative
- Jim Smith, BANN alternate representative
- Taylor Russo, Reno-Sparks Chamber primary representative

- Ann Silver, Reno-Sparks Chamber alternate representative

12. PRESENTATION OF APPLICATIONS TO FILL THE COMMERCIAL CUSTOMER CLASS ALTERNATE VACANCY AND OTHER POSSIBLE VACANCIES, AND POSSIBLE RECOMMENDATION TO THE BOARD

Ms. Folsom presented the application submitted by John Krmpotic to fill the Commercial Customer Class Alternate vacancy.

Upon motion duly made by Member Hayes and seconded by Member Chambers, and carried by unanimous consent of the members present, the Committee approved recommending to the TMWA Board of Directors John Krmpotic to fill the Commercial Customer Class Alternate vacancy.

13. PRESENTATION AND POSSIBLE APPROVAL OF 2020 MEETING SCHEDULE

Ms. Folsom presented the SAC meeting schedule for 2020.

Upon motion duly made by Member Chambers and seconded by Member Kowitz, and carried by unanimous consent of the members present, the Committee approved the Standing Advisory Committee 2020 Meeting schedule.

14. ELECTION OF CHAIR AND VICE CHAIR FOR 2020

Michael Pagni, TMWA Legal Counsel, noted both Chair McGuire and Vice Chair Schmidt were up for re-election.

Upon motion duly made by Member Kowitz and seconded by Member Litster, and carried by unanimous consent of the members present, the Committee approved Neil McGuire as Chair.

Upon motion duly made by Member Schulewitch and seconded by Member Hayes, and carried by unanimous consent of the members present, the Committee approved Fred Schmidt as Vice Chair.

Chair McGuire reopened agenda item #13.

13. PRESENTATION AND POSSIBLE APPROVAL OF 2020 MEETING SCHEDULE

Upon motion duly made by Member Schulewitch and seconded by Member Hayes, and carried by unanimous consent of the members present, the Committee approved to cancel the January 7, 2020 meeting.

15. DISCUSSION AND POSSIBLE DIRECTION TO STAFF REGARDING AGENDA ITEMS FOR FUTURE MEETINGS

Next meeting:

1. Water Supply Update
2. Presentation on the decline in tree canopy
3. Presentation on second quarter FY 2020 financial performance
4. Presentation of different watering advancements and technology

Upon motion duly made by Member Wager and seconded by Member Litster, and carried by unanimous consent of the members present, the Committee approved the following agenda items for future meetings.

16. STAFF ITEMS

There were no staff items

17. COMMITTEE ITEMS

There were no committee items.

18. PUBLIC COMMENT

There was no public comment.

19. ADJOURNMENT

With no further items for discussion, Chair McGuire adjourned the meeting at 4:58 p.m.

Approved by the Standing Advisory Committee in session on _____.

Sonia Folsom, Recording Secretary

City of Reno Urban Forest Decline

02-04-2020 SAC Agenda Item 5

Matt Basile
Urban Forester



Trees Benefits

Total Yearly Eco Benefits

Greenhouse Gas Benefits

\$3,969.35

683.97 lbs CO₂ avoided

1,306,517.44 lbs CO₂ sequestered

Water Benefits

\$52,197.26

10,439,451.82 gallons saved

Energy Benefits

\$184,577.84

1,590,031.50 kWh saved

76,754.06 Therms saved

Air Quality Benefits

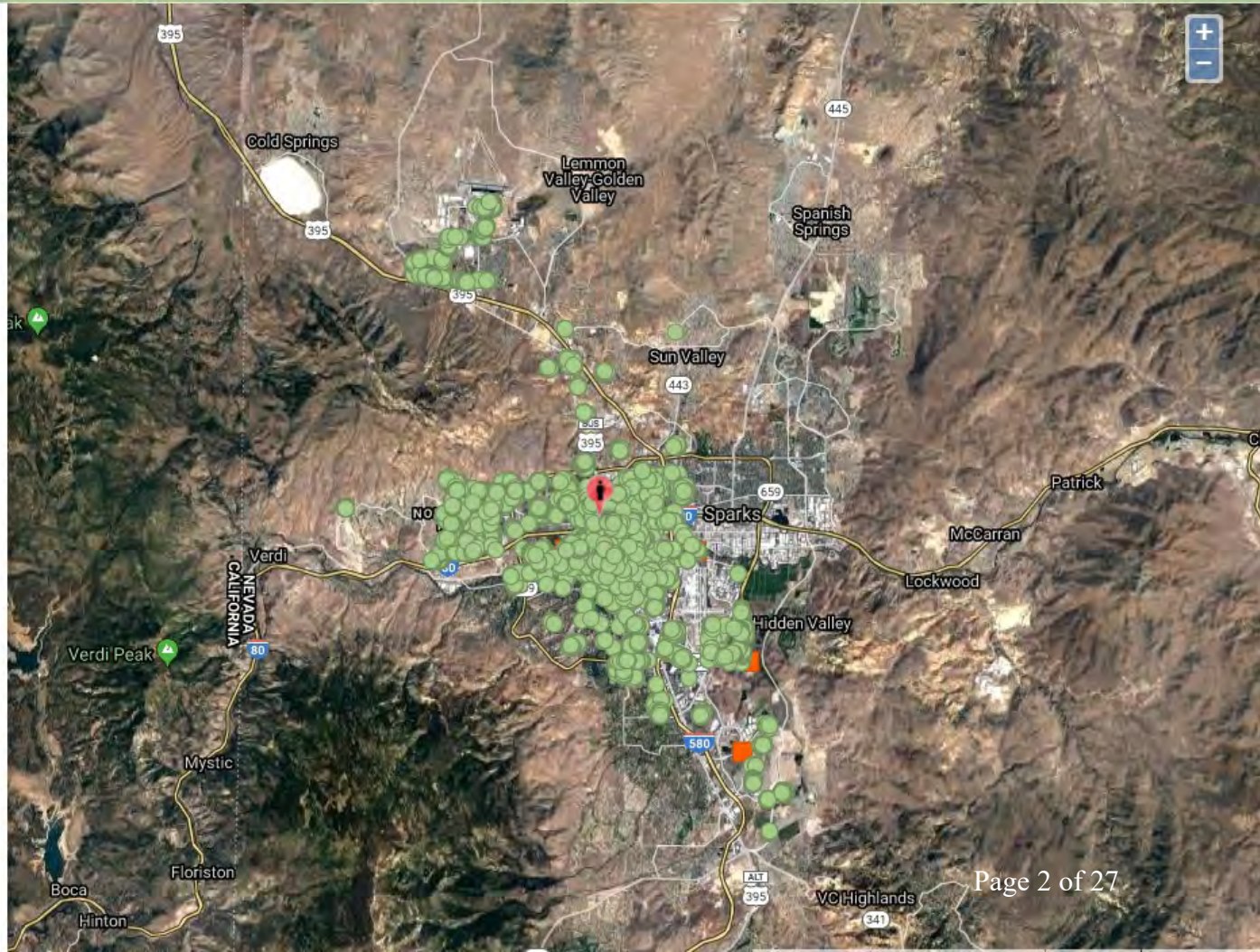
\$3,200.90

2,294.39 lbs pollutants saved

Property Benefits

\$507,235.45

1,976,950.91 leaf surface area (sq.ft.)



Value of City Trees

Trunk Formula Method Worksheet

02-04-2020 SAC Agenda Item 5

Case #	Elm 4	Property	T11 Mark Twain
Appraiser	Matt Basile	Date	#####
Field Observations			
1 Species	Siberian Elm		
2 Condition	70 %		
3 Trunk Diameter	28 inches		
4 Location	63.33333333 %		
	Site	70 %	
	Contribution	70 %	
	Placement	50 %	
Regional Plant Appraisal Committee Information			
5 Species Rating	30 %		
6 Replacement Tree Size	1.69 inches	(TA _R)	
	1.76 in ² /TA _R	(Trunk Area)	
7 Replacement Tree Cost	-		
8 Installation Cost	-		
9 Installation Tree Cost	\$345.46		
10 Unit Tree Cost	\$77.04		
Calculations			
11 Appraised Trunk Area	615 in ²	(TA _A or ATA _A)	
12 Appraised Tree Trunk Increase	613.24 in ²		
(TA _{INCR})	(TA _A or ATA _A)	in ²	
	(TA _R)	in ²	
13 Basic Tree Cost	\$47,589		
	TA _{INCR} (#12)	613.24 in ²	
	Unit Tree Cost (#10)	\$77.04 \$/in ²	
	Installed Tree Cost (#9)	\$345.46	
14 Appraised Value	\$6,329		
	Basic Tree Cost (#13)	47589	
	Species Rating (#5)	30 %	
	Condition (#2)	70 %	
	Location (#4)	63.33333333 %	
15 If the Appraised Value is \$5,000 or greater, round to nearest \$100. If it is less, round to the nearest \$10.			
16 Appraised Value	\$6,300		
Permit fee for tree removal with			
17 acceptable replacement	\$5,955		

Managing the Urban Forest

Secure | <https://renovv.treekeepersoftware.com/index.cfm>

WELCOME, Matt Bas...

Reno, NV

search

Site Information

hackberry, common

131 Washington St, Front 4

Site ID	2342
DBH Range	7-12 inches
Height	5-15 ft
Condition	Good
Area	Unassigned
Zone	NW
Maintenance Task	3
Prune Priority	4
On Street	Washington St

Move Site

Map data ©2018 Google, Imagery ©2018, DigitalGlobe, USGS, Geological Survey, USDA Farm Service Agency, Terms of Use, Report a map

Data about a tree's history

TR Hackberry, Common at 131 Washington St

Welcome, Matt Basile

5 Work Records

[Add Work](#)

<p>Work Type N/A</p> <p>Work Completed 12/12/2013</p>	<p>Work Type N/A</p> <p>Work Completed 07/25/2011</p>
<p>Work Type N/A</p> <p>Work Completed 06/20/2005</p>	<p>Work Type N/A</p> <p>Work Completed 05/25/2000</p>
<p>Work Type N/A</p> <p>Work Completed 06/21/1999</p>	

Work

Project No Project	Work Orders
Work Type N/A	Priority Priority 4 Routine
Work Species	DBH -1
Condition	Status Completed
Requested Date 12/12/2013	Scheduled Date 12/12/2013
Completed Date 12/12/2013	Work Crew TBD
Time 60 Hours 0 Minutes	Cost \$0.00
Last Changed By Justin Stratton (DRG)	Last Changed Date 05/07/2018
Comments [ACTIVITYNO:119945] [WORKTYPE:[DOWNED LIMB (RESPONSE)] [SPECIES:COMMON HACKBERRY]	Post Work Comments

1 Total | 0 Queued

Tree Removals



Lack of Irrigation

According the University of Nevada Reno Extension, a 6 inch caliper tree needs about 5,800 gallons of water a year, at a cost of roughly \$1.82.





Tree preservation during construction



Lots of lateral roots under sidewalk

Silver maple

Oblique and sinker roots under curb and street



Updating ordinances

December 18, 2019

ARTICLE V: - TREE PROTECTION

Section 18.12.501. - Applicability.

This article's tree protection standards shall apply to private protected trees, which are defined as: ~~all new construction and land disturbing activity subject to city requirements for a grading or building permit, where the administrator determines the construction or land disturbing activity is expected to adversely affect mature healthy trees on the site. Such determination shall be made prior to or concurrent with an application for a grading or building permit.~~

- a. A tree that was required by the City of Reno to be planted or retained as mitigation for the removal of a tree; or
- b. A tree planted or retained as a condition or requirement of any city issued planned unit development, special use permit, variance, or building permit, including approvals issued prior to adoption of this article, excluding single family zoned homes or lots.

Section 18.12.502 – Purpose.

It is the intent of this article to implement Guiding Principle 7.7 of the Master Plan to increase the tree canopy and green infrastructure within the city by the retention of healthy, mature trees and the incorporation of new trees in both public and private space.

[Section 18.12.502— Preserved Tree Criteria.

A tree shall be considered to be preserved only if a minimum of 75 percent of the critical root zone is maintained at undisturbed natural grade and no more than 25 percent of the canopy is removed due to building encroachment.]

[Section 18.12.503— Tree Credits.

Existing mature, healthy trees that are preserved along public rights of way or in the front yard may be eligible for a credit toward the total tree requirements stated in Section 18.12.1209's minimum

Tree Planting





- ◎ 66 tree removals over the last year
- ◎ 259 Trees planted

02-04-2020 SAC Agenda Item 5



Tree “giveaway” program with Arbor Day Foundation

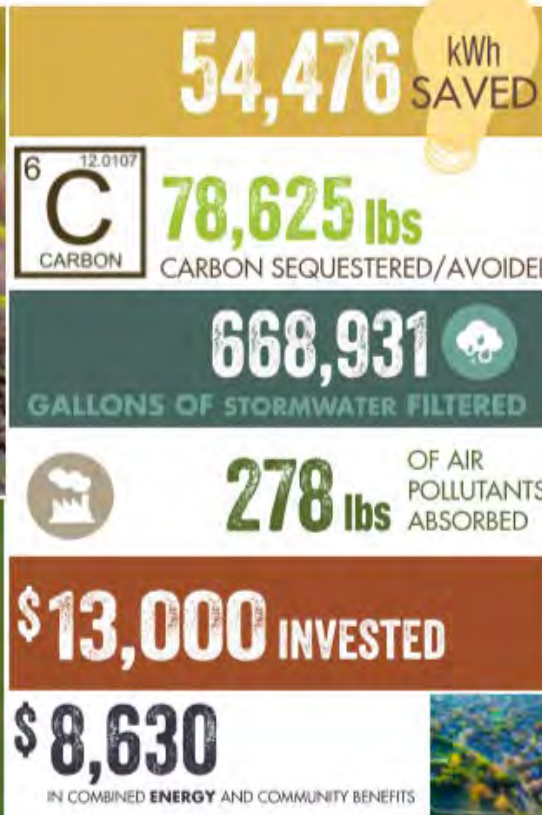
02-04-2020 SAC Agenda Item 5





IMPACT REPORT

THE COMMUNITY CANOPY AND ENERGY-SAVING TREES PROGRAM help improve communities through the use of trees. The trees being distributed to homeowners help clean the air and water. By planting the right trees in the right places to effectively shade their homes, people can also save money on their energy bills. Planting shade and windbreak trees for energy savings is already helping communities large and small improve energy efficiency, and the air, water and carbon benefits will continue to grow as the trees do. Through the program, we have partnered with 60 organizations within 36 states. Check out the overall impact these partner's programs are projected to have on the environment.



**projected 20 year cumulative values*

Established Fall 2019



Developing specifications for constructing new installations

Soil Installation specifications:

All construction debris including base material, limestone, demolition remnants, asphalt, or otherwise disturbed or modified soil/ material must be removed completely and replaced with soil that meet below specifications. Native soil may be amended in a homogenous mixture to meet this specification or the existing soil may be removed and replaced with soil that meets soil composition specifications below. Existing native soil below excavation shall be scarified a minimum 2" depth to encourage percolation from and melding with amended topsoil.

During maintenance work such as replacement of sidewalk, street, carriage walks, driveways, curb and gutter, or other where existing vegetation is present that is to be preserved, only the soil that has been disturbed or was otherwise subjected to excavation must be replaced or meet this criteria.

Newly constructed landscape areas that are to be planted with sod, shrubs or other plant material with a mature height of less than 10 feet must include installation of soil meeting the below specifications throughout the installation to a depth of 6". In landscape areas that are to contain trees soil must meet the specifications below to a minimum depth of 24".

All soil installations (replacement and new construction) shall be mounded slightly and saturated with water immediately after installation to allow for settling and to minimize losses from wind. Soil uncovered with mulch or similar erosion control should be saturated again between 7 and 14 days following installation. Any areas that do settle should be filled with additional approved soil.

Soil composition specifications

Soil shall consist of fertile, friable soil of loamy character that contains organic matter in quantities natural to the region and be capable of sustaining healthy plant life. Soil shall be free from deleterious substances such as road base, litter, refuse, toxic waste, stones larger than 1 inch in size, coarse sand, heavy or stiff clay, brush, sticks, grasses, roots, noxious weed seed, weeds, and other substances detrimental to plant, animal, and human health.

Planting soil must be derived from a combination of the following types of materials:

1. Nutrient rich topsoil that promotes long-term plant growth
2. US Composting Council STA Program Approved compost
3. Added minerals, nutrients or fertilizers following the specific job requirements

Topsoil shall contain materials that maintain or improve soil organic matter content in a manner that does not contribute to the contamination of crops, soil, or water by plant nutrients, pathogenic organisms, heavy metals, or residues of prohibited substances.

The quality characteristics of the planting soil must have the values shown in the following table unless written consent from the City of Reno Urban Forester to accept soil with qualities outside of this range:

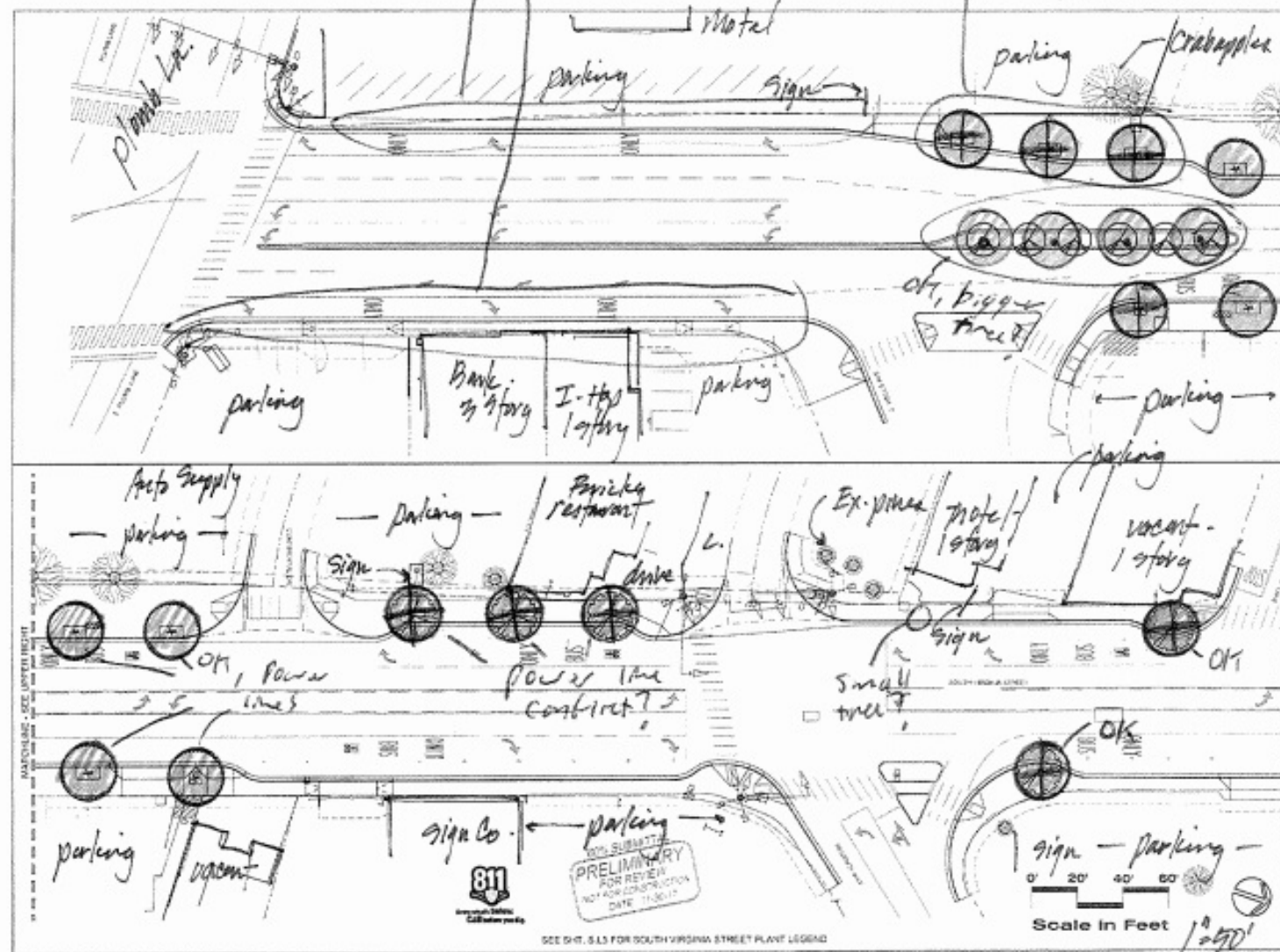
Quality characteristic	Planting Soil Requirement
pH	5.5-8.5
Sodium	< 200 ppm
Nitrogen	Min 50 ppm
Phosphorus	Min 50 ppm
Potassium	Min 50 ppm
Calcium	Min 1,000 ppm
Trace Minerals Sufficient For Plant Growth	
Boron	< 5 ppm
C.E.C meq/100g	12-24
Organic matter content (% available)	Min 2%
Physical contaminants (% volume)	combined total:
Plastic, glass, metal, rocks < 1"	< .1

City of Reno Urban Tree Planting List			Planting Site										Other								
<div><div></div> Denotes excellent tree candidate</div> <div><div></div> Denotes good tree candidate</div> <div><div></div> Blank Box Denotes tree not appropriate for site</div>			City Parkway	Small Parkway	Sidewalk Tree Well	Median	Private Property	Under Wires	Boron Tolerant	Salt Tolerant	Spring Planting Best	Promotes Diversity	Low Maintenance	Disease/Pest Resistant	Availability	Hardiness	Ease of Transplant	Drought Tolerance	USDA Hardiness Zone	Canopy Size Class	Highly Recommended for Reno
Common Name	Genius	Species																			
Bitternut Hickory	<i>Carya</i>	<i>cordiformis</i>												NA	AV-PR	DIF	AV	4-9	4		
Pignut Hickory	<i>Carya</i>	<i>glabra</i>												NA	AV-PR	DIF	AV	5-8	4		
Shellbark Hickory	<i>Carya</i>	<i>laciniosa</i>												NA	AV-PR	DIF	AV	5-8	4		
Shagbark Hickory	<i>Carya</i>	<i>ovata</i>												LTD	AV	DIF	AV	4-8	4		
Mockernut Hickory	<i>Carya</i>	<i>tomentosa</i>												NA	AV-PR	DIF	AV	5-9	4		
Chinese Catalpa	<i>Catalpa</i>	<i>ovata</i>												VLTD	AV	GD	AV	5-8	4		
Southern Catalpa	<i>Catalpa</i>	<i>bignonioides</i>												GD	GD	GD	AV	4-8	3		
Purple Catalpa	<i>Catalpa</i>	<i>x. erubescens 'Purpurea'</i>												GD	GD	GD	AV	4-8	4	YES	
Northern Catalpa	<i>Catalpa</i>	<i>speciosa</i>												GD	EX	GD	AV	4-8	4	YES	
Atlas Cedar	<i>Cedrus</i>	<i>atlantica</i>												GD	GD	GD	GD	6-8	x	YES	
Deodar Cedar	<i>Cedrus</i>	<i>deodara</i>												GD	GD	GD	GD	7-9	x		
Sugarberry	<i>Celtis</i>	<i>laevigata</i>												AV	AV	GD	AV	5-9	4		
Chinese Hackberry	<i>Celtis</i>	<i>sinesis</i>												LTD	GD	DIF	AV	7-9	4		
Hackberry	<i>Celtis</i>	<i>occidentalis</i>												GD	GD	GD	AV	3-9	4	YES	
Katsuratree	<i>Cercidiphyllum</i>	<i>japonicum</i>												GD	GD	DIF	AV	4-8	2		
Eastern Redbud	<i>Cercis</i>	<i>canadensis</i>												GD	AV	AV	AV	3-9	1		
White Fringetree	<i>Chionanthus</i>	<i>virginicus</i>												VLTD	AV	DIF	AV	4-9	1		
American Yellowwood	<i>Cladrastis</i>	<i>kentuckea</i>												VLTD	AV	AV	AV	4-8	3		
Pagoda Dogwood	<i>Cornus</i>	<i>alternifolia</i>												AV	AV-PR	AV	AV	4-8	3		
Corneliancherry Dogwood	<i>Cornus</i>	<i>mas</i>												GD	GD	GD	AV	4-8	1		
Turkish Hazelnut	<i>Corylus</i>	<i>colurna</i>												AV	AV	AV	AV	4-7	3		
Thornless Cockspur Hawthorn	<i>Crataegus</i>	<i>crusgalli</i>												GD	GD	GD	AV	4-7	2		
Washington Hawthorn	<i>Crataegus</i>	<i>phaenopyrum</i>												GD	GD	GD	AV	4-8	2		
Winter King Green Hawthorn	<i>Crataegus</i>	<i>viridis 'Winter King'</i>												GD	GD	GD	AV	4-7	2		
Arizona Cypress	<i>Cupressus</i>	<i>arizonica</i>												GD	GD	GD	GD	7-9	x		
Italian Cypress	<i>Cupressus</i>	<i>sempervirens</i>												VLTD	AV	AV	GD	7-10	x	UP	
Leyland Cypress	<i>x Cupressocyparis</i>	<i>leylandii</i>												GD	GD	GD	GD	6-10	x		
Hardy Rubber Tree	<i>Eucommia</i>	<i>ulmoides</i>												VLTD	AV	GD	AV	5-7	3		



Any room for small trees? lilac/northern?

OK, with
conflict



NCE
1001 S. Arroyo Ave., Suite 111
San Jose, CA 95128
TEL: (408) 291-1200

L.A. Studio Works
ARCHITECTS & INTERIORS
1001 S. Arroyo Ave., Suite 111
San Jose, CA 95128
TEL: (408) 291-1200



**VIRGINIA STREET BUS
RAPID TRANSIT
EXTENSION PROJECT**

C.D.R.

RTC REGIONAL TRANSPORTATION
COMMISSION
1105 KENNEL AVENUE
SUITE 100 SAN JOSE, CA 95128
PHONE: (408) 291-1111

NO.	DATE	REVISION
1	11-20-17	10% SUBMITTAL

PROJECT NO. LA F 301-302-00-17
PROJECT BY: 30
DRAWN BY: LA
CHECKED BY: 301
DATE: 11-20-17

PLANTING PLAN
SOUTH VIRGINIA
STREET

DATE: 11-20-17

SH-1 SH-2 SH-3 SH-4

19 trees

Virginia Street Redesign

- ◉ 259 trees of 14 species
- ◉ 50 tree well planters 5'x10'
- ◉ 81 suspended sidewalk soil systems
- ◉ Existing trees to be preserved where possible



Appropriate soil volume for new trees

02-04-2020 SAC Agenda Item 5

Figure 03a — Typical Urban Street Configuration Aerial View

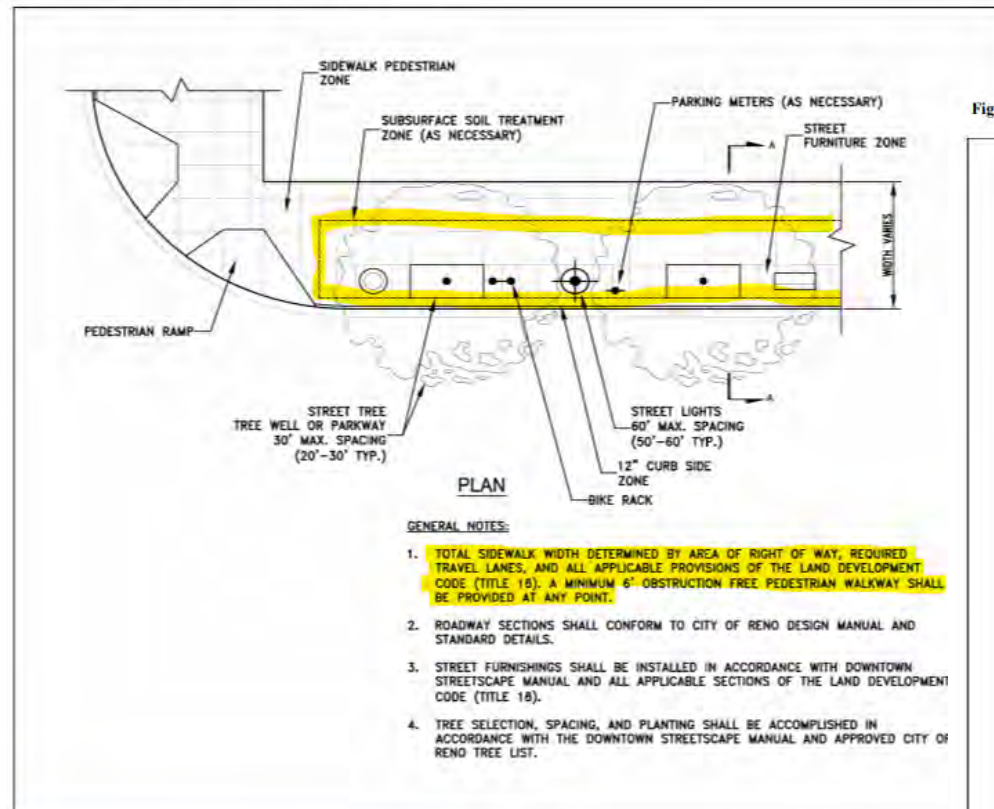
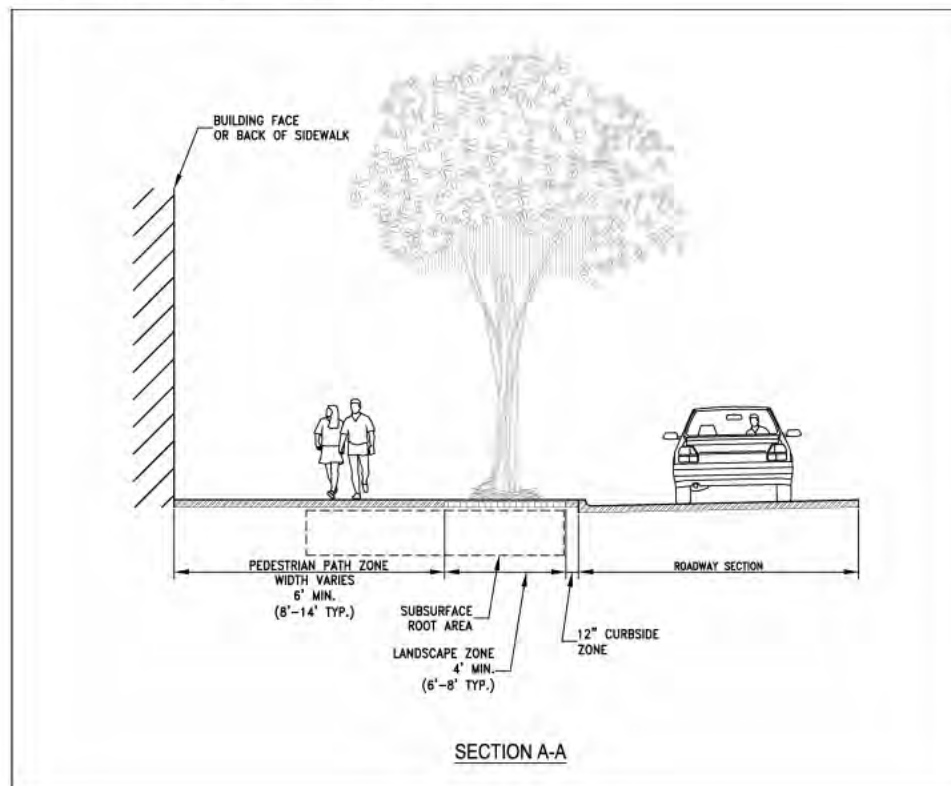


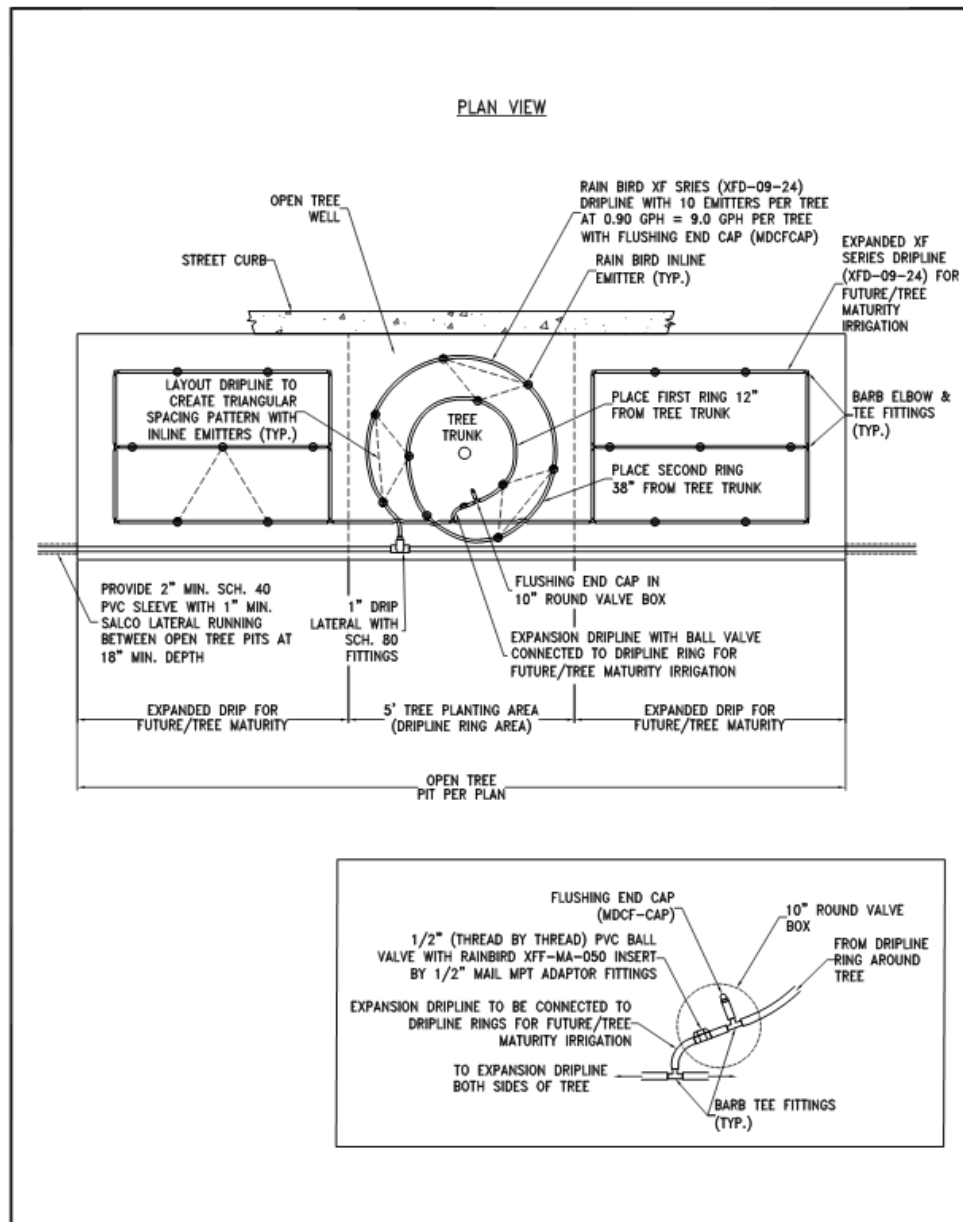
Figure 03b — Typical Urban Street Configuration Cross Section



Midtown suspended pavement system

Average of 750 cubic feet of
soil per tree





STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION

DRAWING No.

TREE DRIP IRRIGATION

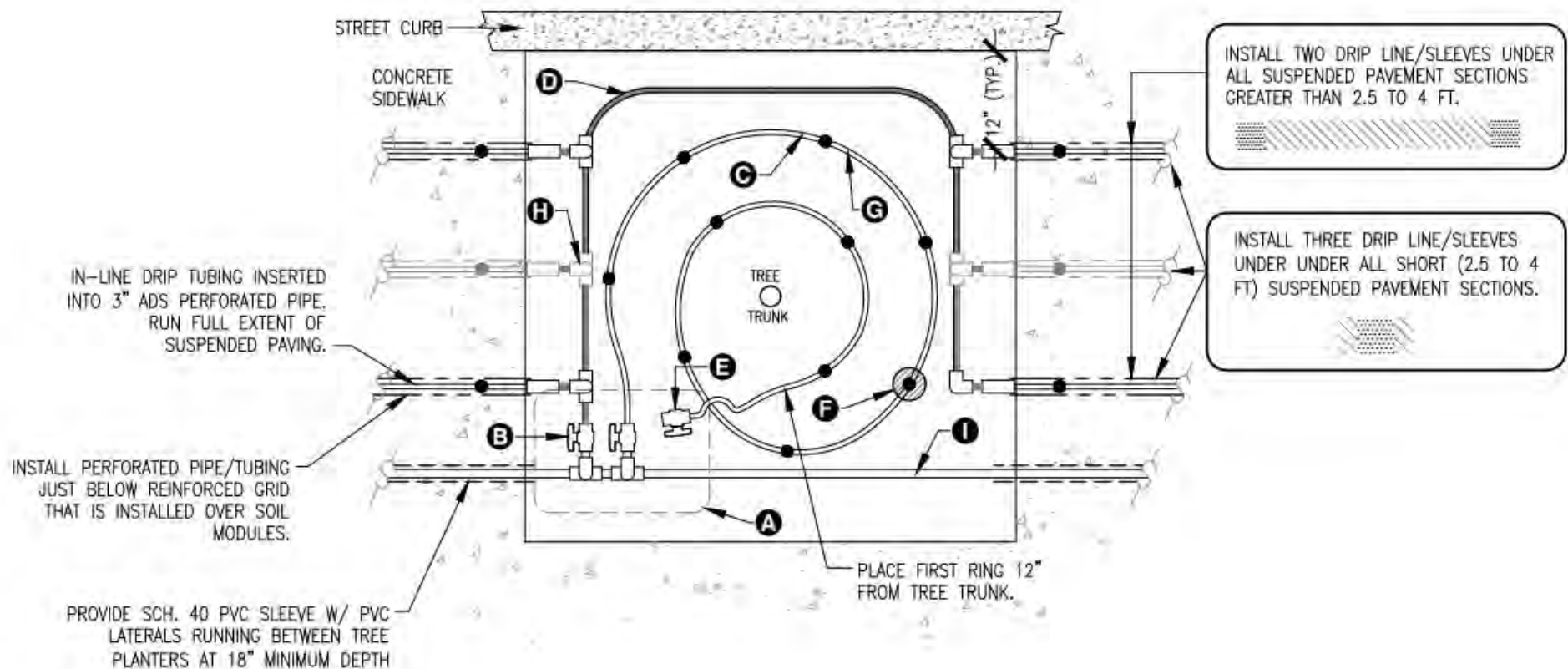
XXXX

APPROVED BY: xx

DATE: 2/2019



Suspended Pavement





Mulch your trees!



Northern Nevada Water Supply Outlook

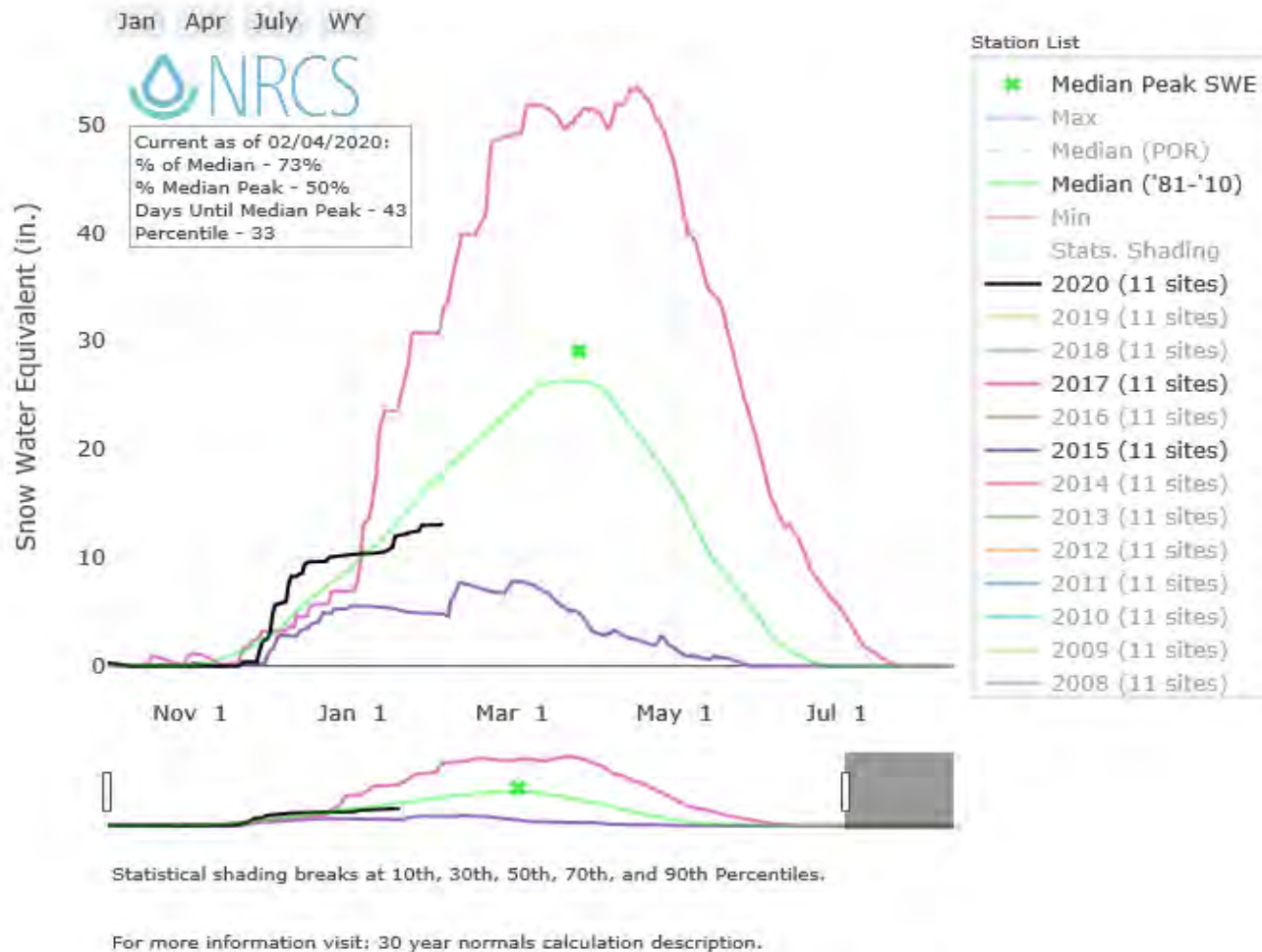
TMWA Standing Advisory Committee Meeting

Bill Hauck, Water Supply Administrator

February 03, 2020

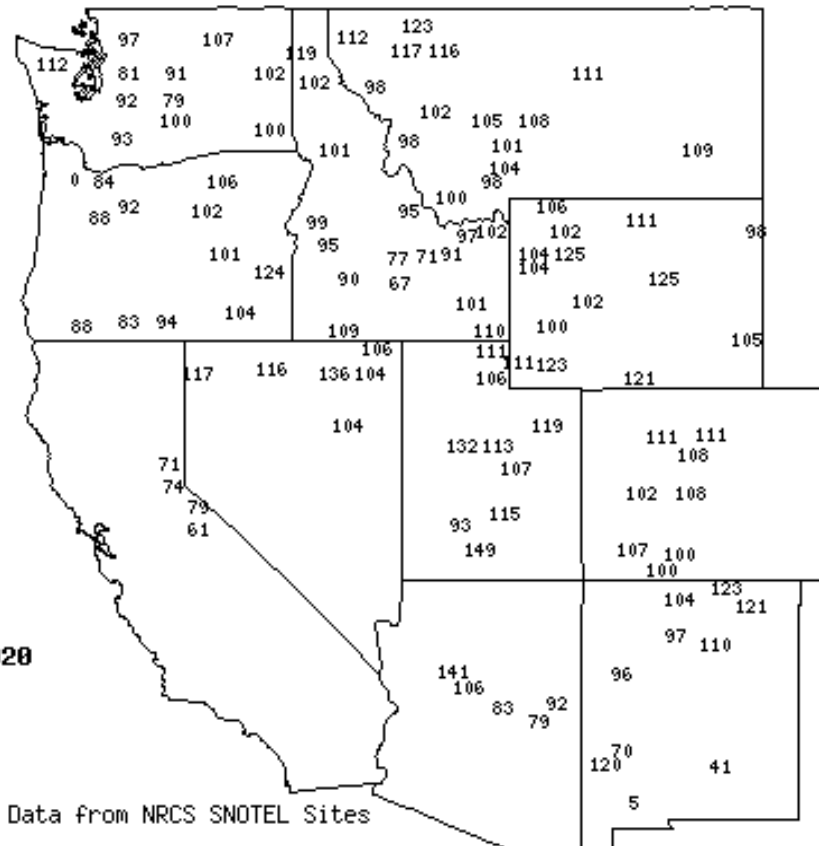


Truckee River Basin Snow Water Equivalent WY 2020



SNOTEL-River Basin Snow Water Content

Basin Average Snow Water Content. (% of Average.)



Report Date:

FEBRUARY 4 , 2020

Provisional Data
Based on Mountain Data from NRCS SNOTEL Sites

Data provided by
Water and Climate Center
Natural Resources Conservation Service

Western Regional Climate Center
Desert Research Institute
Reno, Nevada

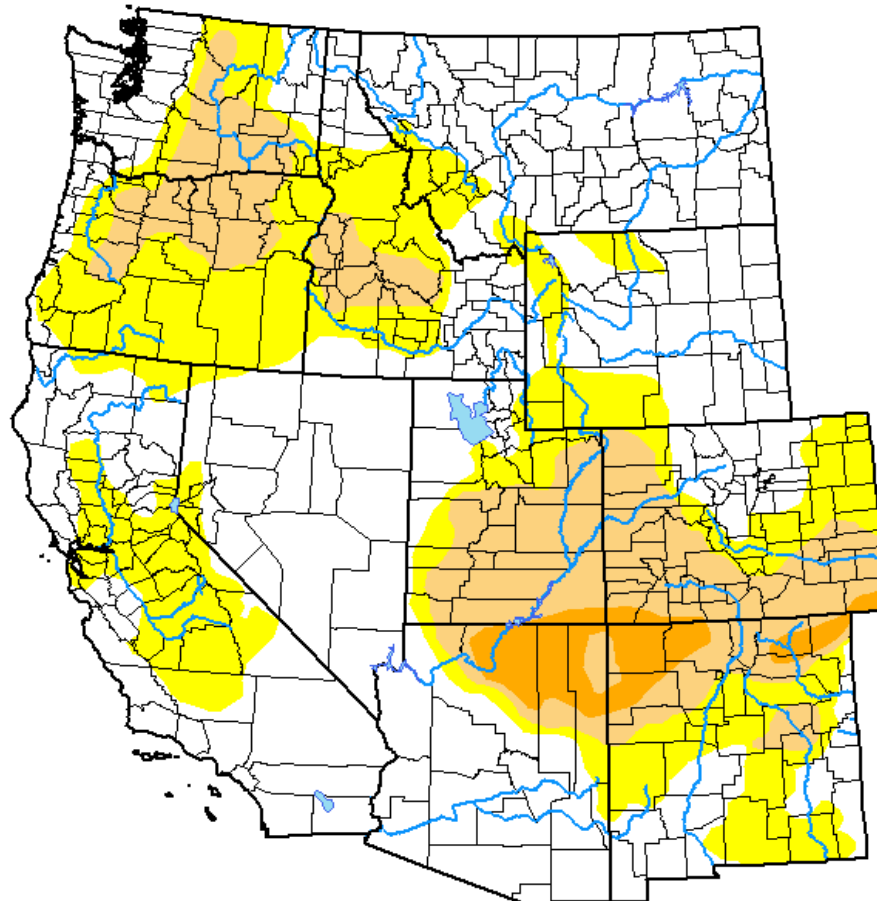
U.S. Drought Monitor (WEST)

02-04-2020 SAC Agenda Item 6

January 28, 2020

(Released Thursday, Jan. 30, 2020)

Valid 7 a.m. EST



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	55.43	44.57	18.96	3.08	0.00	0.00
Last Week <i>01-21-2020</i>	57.88	42.12	19.82	4.99	0.00	0.00
3 Months Ago <i>10-29-2019</i>	62.16	37.84	21.73	9.81	0.00	0.00
Start of Calendar Year <i>12-31-2019</i>	59.17	40.83	18.17	7.12	0.00	0.00
Start of Water Year <i>10-01-2019</i>	68.40	31.60	16.32	3.16	0.00	0.00
One Year Ago <i>01-29-2019</i>	30.36	69.64	41.22	17.12	4.86	0.39

Intensity:

None	D2 Severe Drought
D0 Abnormally Dry	D3 Extreme Drought
D1 Moderate Drought	D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

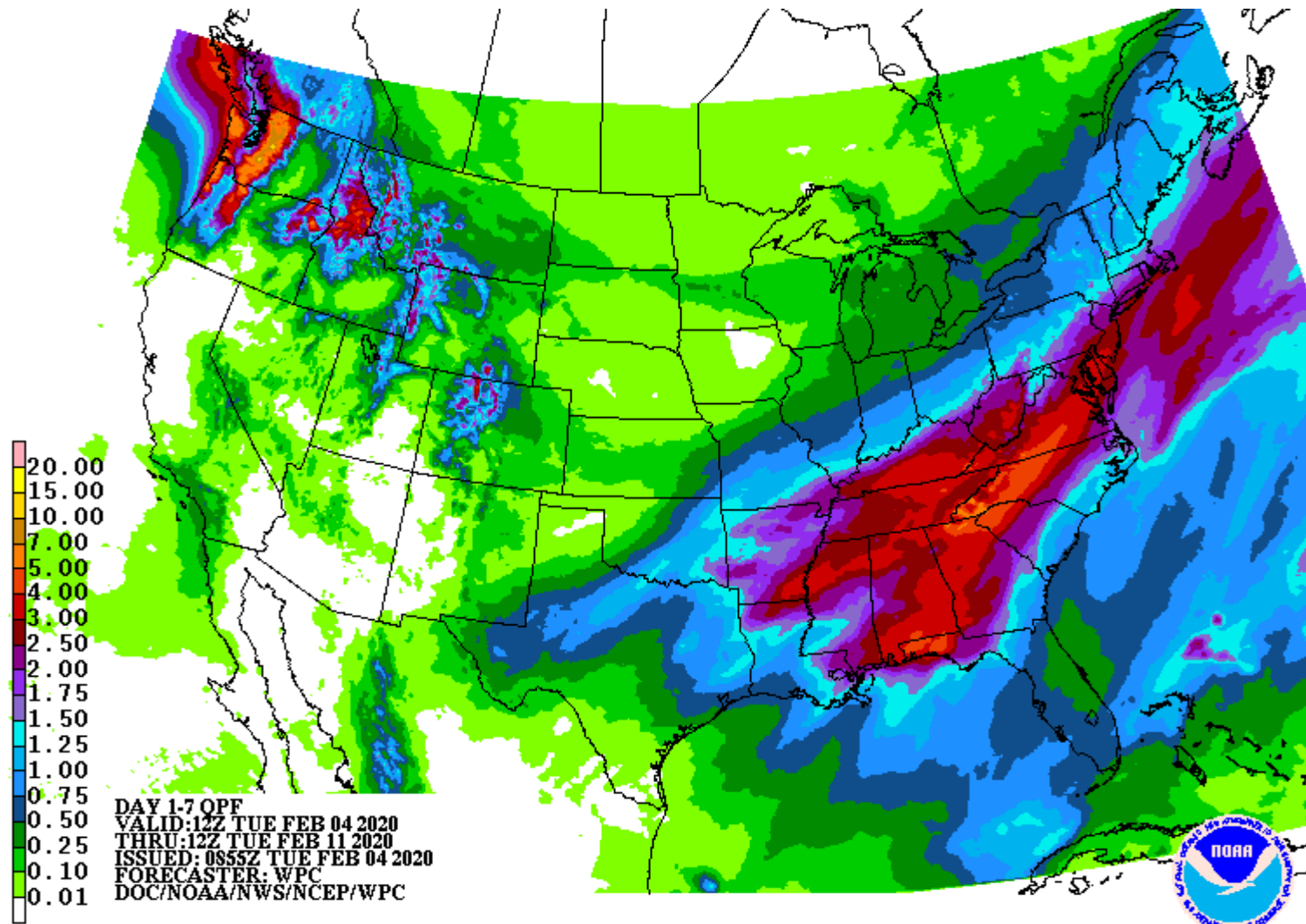
Author:

Richard Heim
NCEI/NOAA

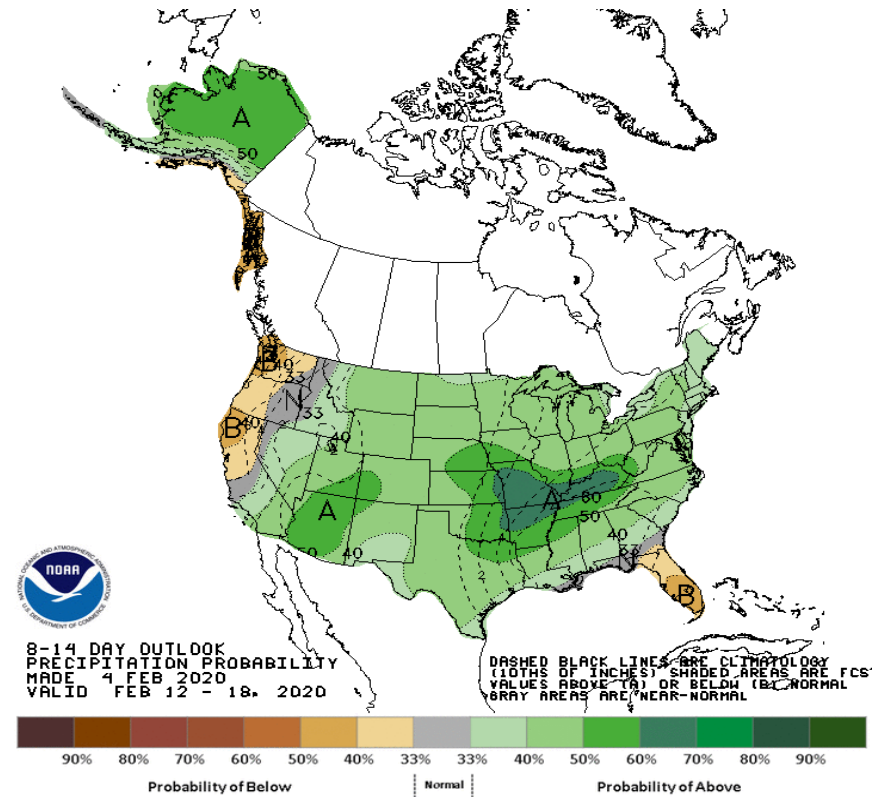
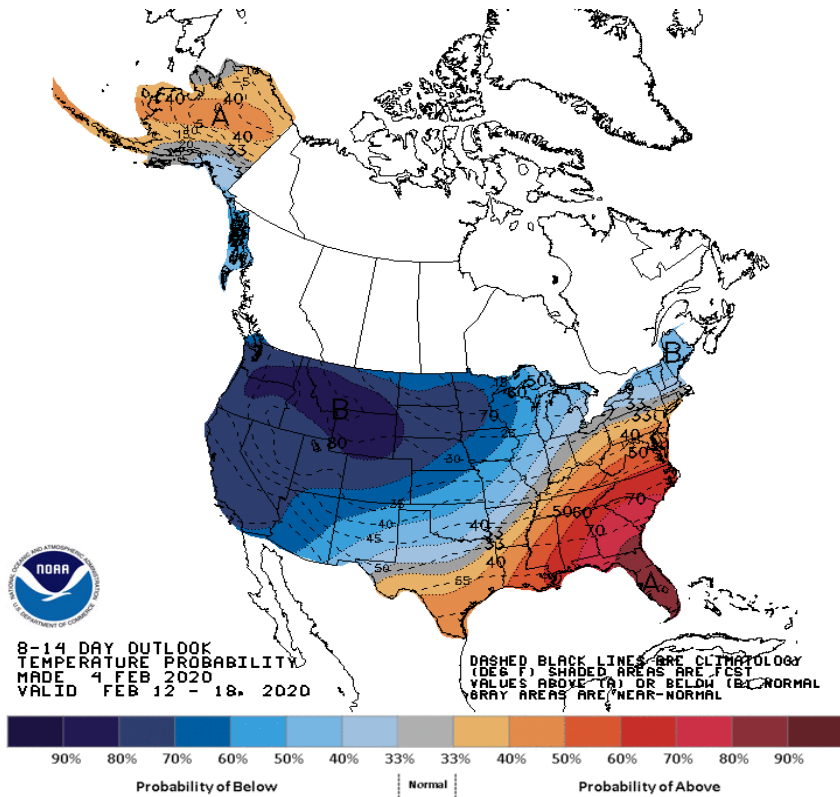


droughtmonitor.unl.edu

NOAA 7-Day Quantitative Precipitation Forecast



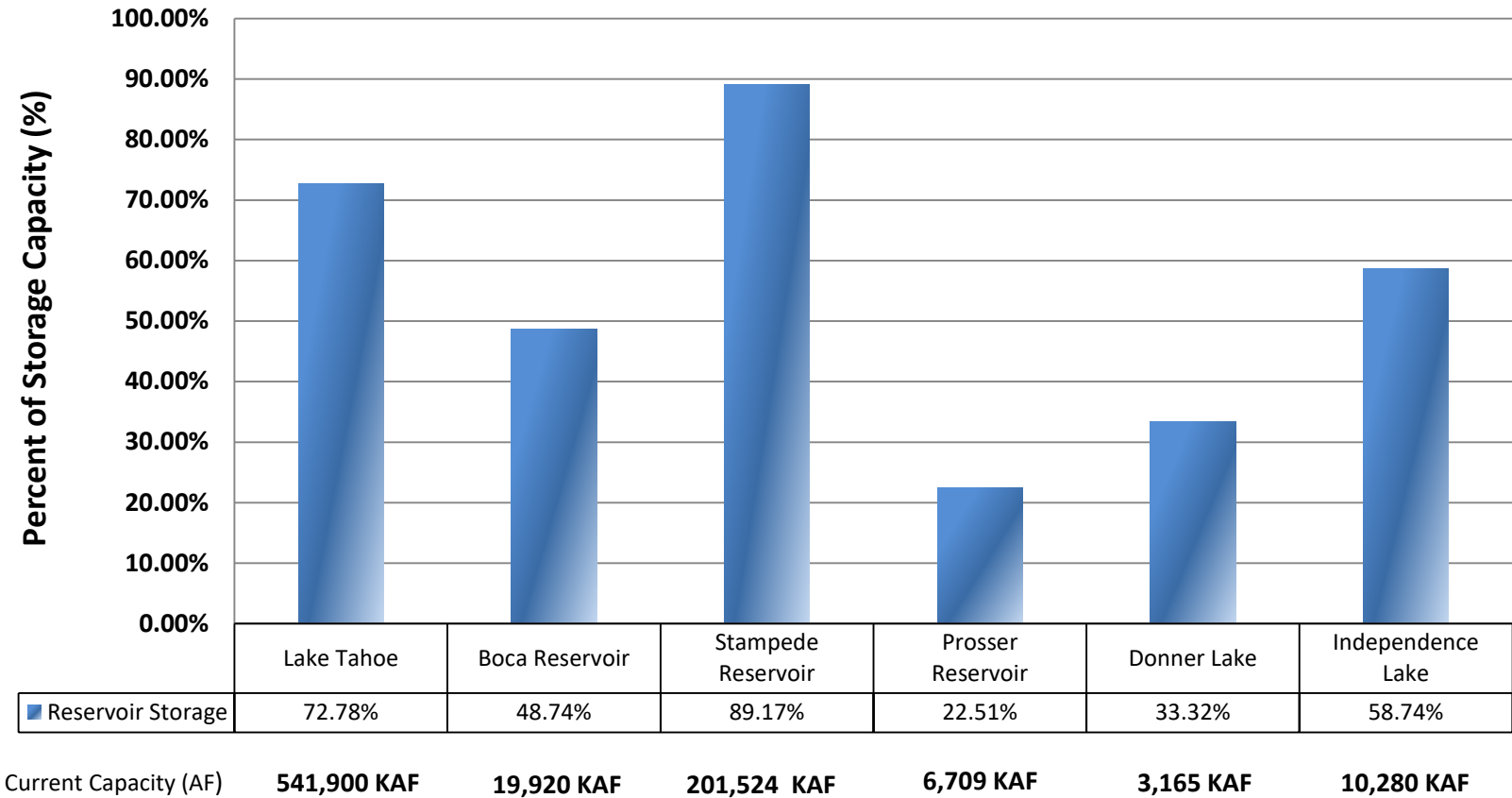
NOAA 8-14 Day Outlook (Temperature and Precipitation Probability)



Truckee River Basin Watershed



Truckee River Reservoir System Storage (02/03/2020)



(MAX SYSTEM CAPACITY 1,068,270 AF)

CURRENT CAPACITY 783,498 AF (73% of Maximum)





Thank you!

Questions?

Bill Hauck, Senior Hydrologist

Email: bhauck@tmwa.com

O: (775) 834-8111 M: (775) 250-1333



TO: Board of Directors
THRU: Mark Foree, General Manager
FROM: Michele Sullivan, Chief Financial Officer
 Matt Bowman, Financial Controller
DATE: January 28, 2020
SUBJECT: **Presentation of Financial Performance for Second Quarter Fiscal Year 2020**

Summary

Please refer to Attachments A-1 and A-2 for full Statements of Revenues, Expenses and Changes in Net Position for both actual to budget and year-over-year comparisons as discussed in the report below.

Budget to Actual

	Actual YTD 2020	Budget YTD 2020	Variance \$	Variance %
CHANGE IN NET POSITION	25,467,224	21,321,710	4,145,514	19%

Change in net position (or overall P&L) during the first half fiscal year 2020 (1H 2020) was \$4.1m higher than budget. This is primarily due to net capital contributions which were approximately \$1.9m higher than budget. Adding to the variance was higher operating income of \$1.7m and lower nonoperating expenses of \$0.6m. Higher capital contributions were driven by higher developer contributions, higher operating income was driven by lower operating expenses, offset by lower water sales, and lower nonoperating expense was driven by higher investment earnings. These variances will be discussed in further detail in the sections to follow.

Year over Year

	Actual YTD 2020	Actual YTD 2019	Variance \$	Variance %
CHANGE IN NET POSITION	25,467,224	28,274,468	(2,807,244)	(10)%

Year over year, change in net position was \$2.8m lower in 1H 2020 compared to 1H 2019. This is due primarily to lower operating income of \$3.7m, offset by higher capital contributions of \$0.9m. Lower operating income was mostly the result of lower water sales of \$2.8m and higher capital contributions was due to higher developer contributions of \$1.2m. These variances will be discussed in further detail in the sections to follow.

RevenueBudget to Actual

	Actual YTD 2020	Budget YTD 2020	Variance \$	Variance %
OPERATING REVENUES				
Charges for Water Sales	60,437,384	63,111,410	(2,674,026)	(4)%
Hydroelectric Sales	1,816,370	1,788,205	28,165	2 %
Other Operating Sales	1,535,207	1,764,600	(229,393)	(13)%
Total Operating Revenues	63,788,960	66,664,215	(2,875,255)	(4)%

Operating revenue was \$2.9m lower than budget due mostly to \$2.7m (4%) less in water sales. TMWA's water sales budget is derived from several inputs including historical water usage. Water use for the first half of the year was down 8.5% on a per service basis year over year and 5.7% down from the previous five year average. Most of this variance occurred in the first quarter and was driven by moderate temperatures. Temperatures remained mild with only one day reaching 100 degrees during July, August and September. This likely influenced behavior, keeping irrigation water use lower in the first quarter and continuing into the second quarter.

Year over Year

	Actual YTD 2020	Actual YTD 2019	Variance \$	Variance %
OPERATING REVENUES				
Charges for Water Sales	60,437,384	63,236,126	(2,798,742)	(4)%
Hydroelectric Sales	1,816,370	1,354,168	462,202	34 %
Other Operating Sales	1,535,207	1,825,660	(290,453)	(16)%
Total Operating Revenues	63,788,960	66,415,954	(2,626,994)	(4)%

Total operating revenues were \$2.6m less in 1H FY 2020 compared to the prior year. This is due mostly to water sales which were \$2.8m lower year over year. As discussed above, milder temperatures in the first quarter led to lower water use, which continued into the second quarter. During the first quarter FY 2019, there was 20 days at 100 degrees or more, whereas only one day in the first quarter FY 2020. The trend continued into Q2, with approximately 10% less water use year over year. Hydroelectric sales are up year over year due to the Fleish plant being taken offline in FY 2019 for maintenance.

Operating Expenses**Budget to Actual**

	Actual YTD 2020	Budget YTD 2020	Variance \$	Variance %
OPERATING EXPENSES				
Salaries and Wages	11,246,886	11,603,019	(356,133)	(3)%
Employee Benefits	4,928,192	6,231,021	(1,302,829)	(21)%
Services and Supplies	14,648,376	17,361,176	(2,712,800)	(16)%
Total Operating Expenses Before Depreciation	30,823,454	35,195,217	(4,371,763)	(12)%
Depreciation	16,626,868	16,796,957	(170,089)	(1)%
Total Operating Expenses	47,450,322	51,992,174	(4,541,852)	(9)%

Total operating expenses were \$4.5m lower than budget for 1H 2020. This is primarily due to lower services and supplies costs (\$2.7m lower than budget). Of this variance, \$1.6m stems from two ongoing projects, the Glendale diversion re-construction and the Customer Information System (CIS) implementation project. A portion of the Glendale diversion project was budgeted in operating expense, however it's likely the project will ultimately be fully capitalized. This results in an underspend in operating expenses and an overspend in capital. Additionally, TMWA is working with FEMA to receive reimbursement of up to 75% of the total costs. The CIS project will have an expensed portion, but those costs have not yet been incurred. Approximately \$0.6m of the variance is related to this but is expected to be temporary. Electric power and chemical costs were down a combined \$0.8m due to lower water usage as discussed above.

Employee benefits are lower due to lower PERS expense incurred in 1H 2020 of \$1.4m compared to budget. This variance is likely temporary as accounting standards require an annual adjustment to the expense which typically increases what has been recognized throughout the year.

Year over Year

	Actual YTD 2020	Actual YTD 2019	Variance \$	Variance %
OPERATING EXPENSES				
Salaries and Wages	11,246,886	10,633,632	613,254	6 %
Employee Benefits	4,928,192	4,648,236	279,956	6 %
Services and Supplies	14,648,376	14,915,108	(266,732)	(2)%
Total Operating Expenses Before Depreciation	30,823,454	30,196,976	626,478	2 %
Depreciation	16,626,868	16,196,368	430,500	3 %
Total Operating Expenses	47,450,322	46,393,344	1,056,978	2 %

Total operating expenses were \$1.1m higher in 1H 2020 compared to the prior year. As budgeted, salaries and wages and employee benefits are each up from the prior year. This is due to headcount, step and cost of living increases. Services and supplies are down \$0.3m year over year. Reductions in chemical costs and costs related to cleaning the outlet channel at Donner Lake incurred in the prior year led to this variance. Again, caused by lower water usage, chemical costs were lower by \$0.1m year over year. In the first half FY 2019 TMWA was completing the clean-out of the Donner Lake outlet channel and incurred expenses of approximately \$0.9m. These reductions year over year were offset primarily by increases in expenses related to Indirect Potable Reuse projects of approximately \$0.7m, which are expensed during feasibility stages.

Non-Operating ExpensesBudget to Actual

	Actual YTD 2020	Budget YTD 2020	Variance \$	Variance %
NONOPERATING REVENUES (EXPENSES)				
Investment Earnings	2,200,665	1,704,908	495,757	29 %
Net Increase (Decrease) in FV of Investments	269,650	—	269,650	— %
Gain (Loss) on Disposal of Assets	(258,147)	—	(258,147)	— %
Amortization of Bond/note Issuance Costs	(123,653)	(95,400)	(28,253)	30 %
Interest Expense	(6,389,988)	(6,532,693)	142,705	(2)%
Other Nonoperating Revenue	—	—	—	— %
Other Nonoperating Expense	—	—	—	— %
Total Nonoperating Revenues (Expenses)	(4,301,473)	(4,923,185)	621,712	(13)%

Nonoperating expenses were \$0.6m lower compared to budget in 1H 2020. This is primarily due to higher investment income of \$0.8m. Most of this variance occurred in Q1, with Q2 remaining consistent with budget. Investment earnings which reflects interest and amortization of investment premiums and discounts is due to higher cash balances invested during the period and slightly higher invested rates. Net increase in FV of investments is due to investments in securities at higher rates than current market rates.

Year over Year

	Actual YTD 2020	Actual YTD 2019	Variance \$	Variance %
NONOPERATING REVENUES (EXPENSES)				
Investment Earnings	2,200,665	2,026,855	173,810	9 %
Net Increase (Decrease) in FV of Investments	269,650	606,107	(336,457)	(56)%
Gain (Loss) on Disposal of Assets	(258,147)	22,539	(280,686)	(1,245)%
Amortization of Bond/note Issuance Costs	(123,653)	(125,608)	1,955	(2)%
Interest Expense	(6,389,988)	(6,619,609)	229,621	(3)%
Other Nonoperating Revenue	—	19	(19)	(100)%
Other Nonoperating Expense	—	(185,844)	185,844	(100)%
Total Nonoperating Revenues (Expenses)	(4,301,473)	(4,275,541)	(25,932)	1 %

Nonoperating expenses were relatively flat compared to prior year with a 1% increase over prior year. There were no large or unexpected variances within this financial grouping year over year.

Capital Contributions**Budget to Actual**

	Actual YTD 2020	Budget YTD 2020	Variance \$	Variance %
CAPITAL CONTRIBUTIONS				
Grants	—	968,750	(968,750)	(100)%
Water Meter Retrofit Program	—	—	—	— %
Water Resource Sustainability Program	669,889	463,212	206,677	45 %
Developer Infrastructure Contributions	84,627	—	84,627	— %
Developer Will-serve Contributions (Net of Refunds)	2,370,908	2,533,768	(162,860)	(6)%
Developer Capital Contributions - Other	4,719,221	3,348,500	1,370,721	41 %
Developer Facility Charges (Net of Refunds)	5,557,914	4,258,624	1,299,290	31 %
Net Capital Contributions	13,430,059	11,572,855	1,857,204	16 %

Capital contributions were \$1.9m higher than budget in 1H 2020. This was driven by higher developer contributions of \$2.8m offset by lower grant revenue of \$1.0m. The increase in developer contributions occurred in Q1 with more projects being funded prior to the fee increase on October 1st. The increase in fees has not impacted revenue significantly since the implementation. The variance in grant proceeds is related to timing. These proceeds are expected later in the year.

Year over Year

	Actual YTD 2020	Actual YTD 2019	Variance \$	Variance %
CAPITAL CONTRIBUTIONS				
Grants	—	331,116	(331,116)	(100)%
Water Meter Retrofit Program	—	926,425	(926,425)	(100)%
Water Resource Sustainability Program	669,889	—	669,889	— %
Developer Infrastructure Contributions	84,627	—	84,627	— %
Developer Will-serve Contributions (Net of Refunds)	2,370,908	3,044,558	(673,650)	(22)%
Developer Capital Contributions - Other	4,719,221	3,414,231	1,304,990	38 %
Developer Facility Charges (Net of Refunds)	5,557,914	4,811,069	746,845	16 %
Net Capital Contributions	13,430,059	12,527,400	902,659	7 %

Capital contributions are higher than prior year in the first quarter by \$0.9m. This is primarily due to the increase in developer contributions as discussed above.

Capital Spending

Spending on capital outlays and construction projects during the first six months of the fiscal year was approximately \$19.9m. Total planned spending for the year is expected to be between \$45m and \$50m as compared to the FY 2020 budget of \$58.5m. Top project spend during the first half of the year is below -

- Mount Rose Water Treatment Plant \$6.3m
- Customer Information System Replacement \$1.6m
- Glendale Diversion Repair \$2.6m

Cash Position

At December 31, 2019, total cash on hand was \$213.5m or \$15.7m higher than at the beginning of the fiscal year. Of the total cash on hand, \$156.5m was unrestricted to be used to meet upcoming and future operating & maintenance expenses, principal & interest payments and construction project payments. The remaining \$57.0m was restricted to pay for scheduled bond principal and interest payments as well as maintaining required reserves as stipulated in our bond covenants.

Truckee Meadows Water Authority

Comparative Statements of Revenues, Expenses and Changes in Net Position
For the six months ended December 31, 2019

	Actual YTD 2020	Budget YTD 2020	Variance \$	Variance %
OPERATING REVENUES				
Charges for Water Sales	\$ 60,437,384	\$ 63,111,410	\$ (2,674,026)	(4)%
Hydroelectric Sales	1,816,370	1,788,205	28,165	2 %
Other Operating Sales	1,535,207	1,764,600	(229,393)	(13)%
Total Operating Revenues	63,788,960	66,664,215	(2,875,255)	(4)%
OPERATING EXPENSES				
Salaries and Wages	11,246,886	11,603,019	(356,133)	(3)%
Employee Benefits	4,928,192	6,231,021	(1,302,829)	(21)%
Services and Supplies	14,648,376	17,361,176	(2,712,800)	(16)%
Total Operating Expenses Before Depreciation	30,823,454	35,195,217	(4,371,763)	(12)%
Depreciation	16,626,868	16,796,957	(170,089)	(1)%
Total Operating Expenses	47,450,322	51,992,174	(4,541,852)	(9)%
OPERATING INCOME	16,338,638	14,672,041	1,666,597	11 %
NONOPERATING REVENUES (EXPENSES)				
Investment Earnings	2,200,665	1,704,908	495,757	29 %
Net Increase (Decrease) in FV of Investments	269,650	—	269,650	— %
Gain (Loss) on Disposal of Assets	(258,147)	—	(258,147)	— %
Amortization of Bond/note Issuance Costs	(123,653)	(95,400)	(28,253)	30 %
Interest Expense	(6,389,988)	(6,532,693)	142,705	(2)%
Other Nonoperating Revenue	—	—	—	— %
Other Nonoperating Expense	—	—	—	— %
Total Nonoperating Revenues (Expenses)	(4,301,473)	(4,923,185)	621,712	(13)%
Gain (Loss) Before Capital Contributions	12,037,165	9,748,855	2,288,310	23 %
CAPITAL CONTRIBUTIONS				
Grants	—	968,750	(968,750)	(100)%
Water Meter Retrofit Program	—	—	—	— %
Water Resource Sustainability Program	669,889	463,212	206,677	45 %
Developer Infrastructure Contributions	84,627	—	84,627	— %
Developer Will-serve Contributions (Net of Refunds)	2,370,908	2,533,768	(162,860)	(6)%
Developer Capital Contributions - Other	4,719,221	3,348,500	1,370,721	41 %
Developer Facility Charges (Net of Refunds)	5,557,914	4,258,624	1,299,290	31 %
Net Capital Contributions	13,430,059	11,572,855	1,857,204	16 %
CHANGE IN NET POSITION	25,467,224	21,321,710	4,145,514	19 %

Truckee Meadows Water Authority

Comparative Statements of Revenues, Expenses and Changes in Net Position
For the six months ended December 31, 2019

	Actual YTD 2020	Actual YTD 2019	Variance \$	Variance %
OPERATING REVENUES				
Charges for Water Sales	\$ 60,437,384	\$ 63,236,126	\$ (2,798,742)	(4)%
Hydroelectric Sales	1,816,370	1,354,168	462,202	34 %
Other Operating Sales	1,535,207	1,825,660	(290,453)	(16)%
Total Operating Revenues	63,788,960	66,415,954	(2,626,994)	(4)%
OPERATING EXPENSES				
Salaries and Wages	11,246,886	10,633,632	613,254	6 %
Employee Benefits	4,928,192	4,648,236	279,956	6 %
Services and Supplies	14,648,376	14,915,108	(266,732)	(2)%
Total Operating Expenses Before Depreciation	30,823,454	30,196,976	626,478	2 %
Depreciation	16,626,868	16,196,368	430,500	3 %
Total Operating Expenses	47,450,322	46,393,344	1,056,978	2 %
OPERATING INCOME	16,338,638	20,022,610	(3,683,972)	(18)%
NONOPERATING REVENUES (EXPENSES)				
Investment Earnings	2,200,665	2,026,855	173,810	9 %
Net Increase (Decrease) in FV of Investments	269,650	606,107	(336,457)	(56)%
Gain (Loss) on Disposal of Assets	(258,147)	22,539	(280,686)	(1,245)%
Amortization of Bond/note Issuance Costs	(123,653)	(125,608)	1,955	(2)%
Interest Expense	(6,389,988)	(6,619,609)	229,621	(3)%
Other Nonoperating Revenue	—	19	(19)	(100)%
Other Nonoperating Expense	—	(185,844)	185,844	(100)%
Total Nonoperating Revenues (Expenses)	(4,301,473)	(4,275,541)	(25,932)	1 %
Gain (Loss) Before Capital Contributions	12,037,165	15,747,068	(3,709,903)	(24)%
CAPITAL CONTRIBUTIONS				
Grants	—	331,116	(331,116)	(100)%
Water Meter Retrofit Program	—	926,425	(926,425)	(100)%
Water Resource Sustainability Program	669,889	—	669,889	— %
Developer Infrastructure Contributions	84,627	—	84,627	— %
Developer Will-serve Contributions (Net of Refunds)	2,370,908	3,044,558	(673,650)	(22)%
Developer Capital Contributions - Other	4,719,221	3,414,231	1,304,990	38 %
Developer Facility Charges (Net of Refunds)	5,557,914	4,811,069	746,845	16 %
Net Capital Contributions	13,430,059	12,527,400	902,659	7 %
CHANGE IN NET POSITION	25,467,224	28,274,468	(2,807,244)	(10)%

Water-Saving Devices and Technology

Laine Christman
Resource Economist/Conservation Supervisor

February 4, 2020



Real-Time Leak Detection Devices





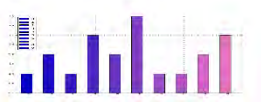


Overview

- Two Main Categories
 - Category 1 – Sub-meters
 - Category 2 – Moisture sensors
- Overall Goal
 - Early detection of a leak via notification by phone
- Costs
 - Range from less than \$100 to \$1,000
- Benefit
 - Prevents water waste
 - Saves money on water bill
 - Saves money on potentially costly damage to property

All examples of devices in this presentation are for reference only and do not reflect all options available. TMWA has not tested, nor is promoting any one type of device. Examples provided are for informational purposes only.

Real-Time Leak Detection Devices

Sub-Meters

- Most connect directly to the main supply line 
- Most require professional installation 
- Connect to WiFi 
- Have a smartphone app 
- Analyze water consumption 
- Allow water to be turned off remotely 
- Most can shut off the water supply if a leak is detected 

Real-Time Leak Detection Devices

Sub-Meter Examples (with Automatic Water Shut-Off)

- Phyn www.phyn.com



- LeakSmart Valve www.leaksmart.com



- Flo by Moen www.meetflo.com



- Buoy Water Leak Detector www.buoy.ai



Real-Time Leak Detection Devices

Sub-Meter Examples (without Automatic Water Shut-Off)

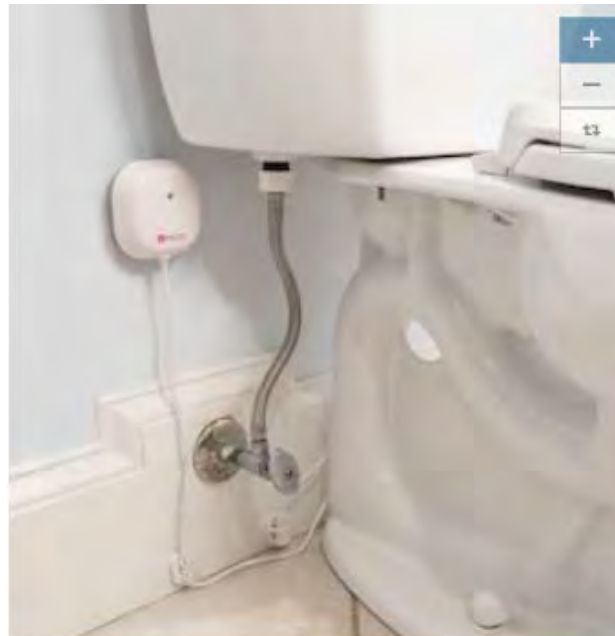
- Flume www.flumetech.com



Real-Time Leak Detection Devices

Leak Sensor Examples

- Insteaon
- Fibaror
- Samsung SmartThings
- Utilitech



Smart Irrigation Controller

Overview

- Weather-based irrigation controllers (WBICs) use various methods of adjusting irrigation times based on weather feature (rain, wind, ET, soil-moisture, etc.)
- WBICs can adjust amount of water needed per cycle.
- WBICs can delay watering until another day if rain is projected/detected
- Some required additional sensors (soil-moisture probes, rain sensors, flow sensors, etc.)
- Some use local weather information (NOAA)
- WiFi connectivity

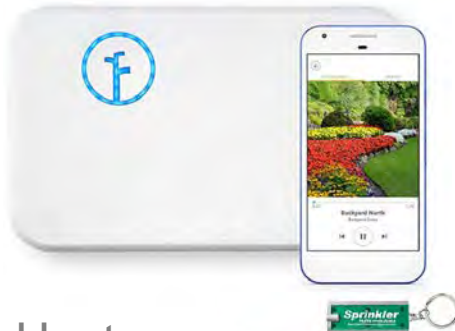
Smart Irrigation Controller

Controller Examples

- Rain Bird



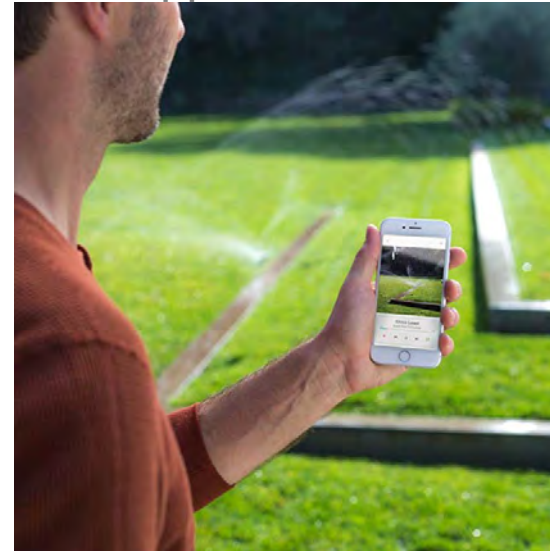
- Rachio



- Hunter



- Smart Apps



- “Smart home” compatible (Alexa, Siri, etc.)



Thank you!

Questions?