
Greenferry Water District Board Meeting

December 14, 2020

Agenda

- Review of Existing System
 - Updates to last presentation
- Review Growth Projection
- Future Demand and Production
- Review of Deficiencies and Potential Improvements
- Next Steps and Schedule

Demand and Production Review

Existing EDUs

- Estimated EDUs
 - Period Analyzed: June 2019 – May 2020

	Total Consumption (gallons)	Total Active Connections	Average Daily Consumption per Connection (gpd)	Total Active EDUs
Residential	52,679,000	340	424	340
Inactive		11		11
Vacant ¹		26		26
Total Obligated EDUs ²		377		377

Notes:

1. Remaining Bella Ridge and Cedar Creek lots
2. Does not include Riverview Heights

Summary of Demand

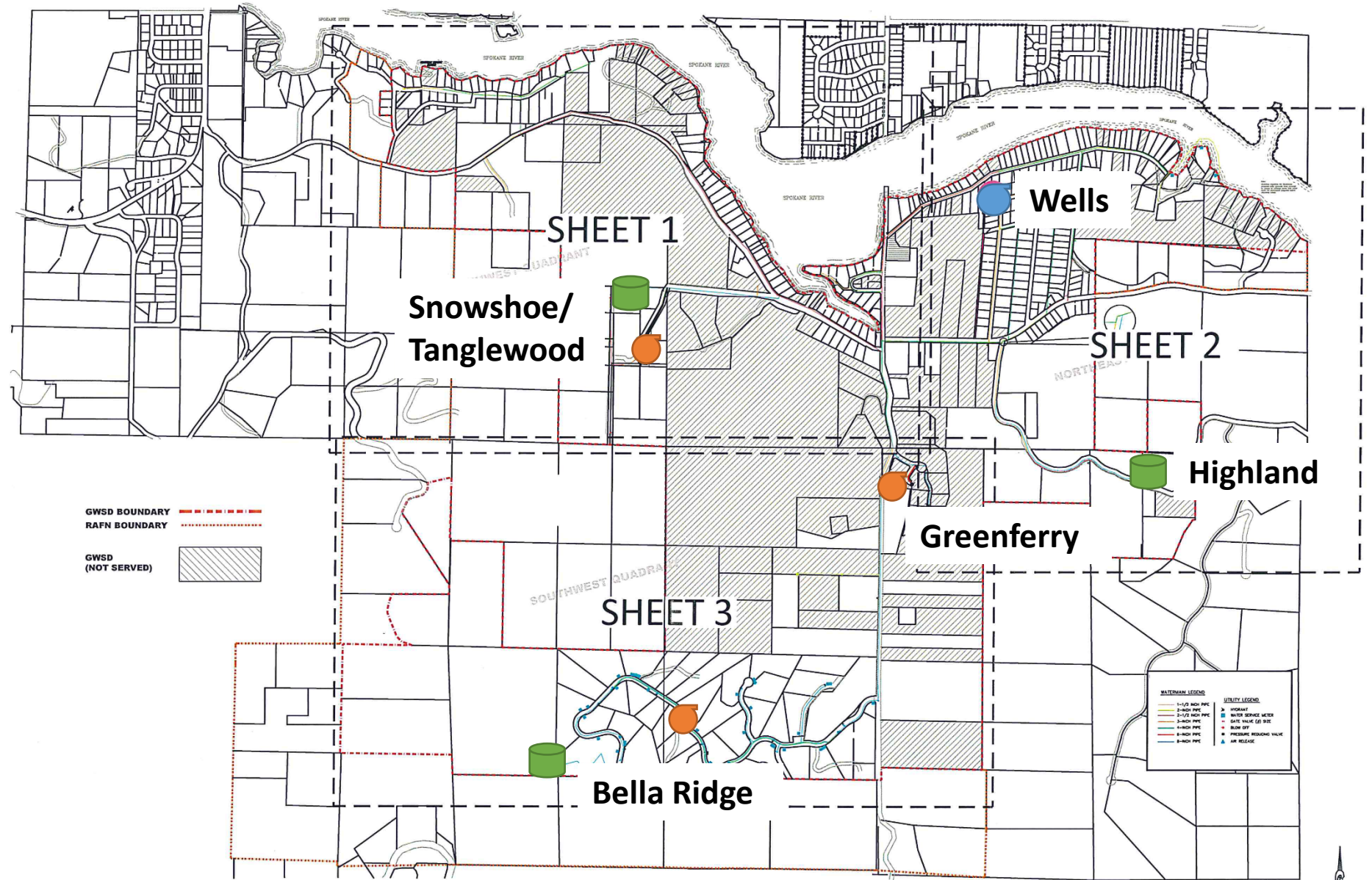
- Period Analyzed: June 2019 to May 2020

Total Current EDUs	377
Average Daily Production	154 gpm
Max. Daily Production	458 gpm
Peak Hourly Production	1,015 gpm

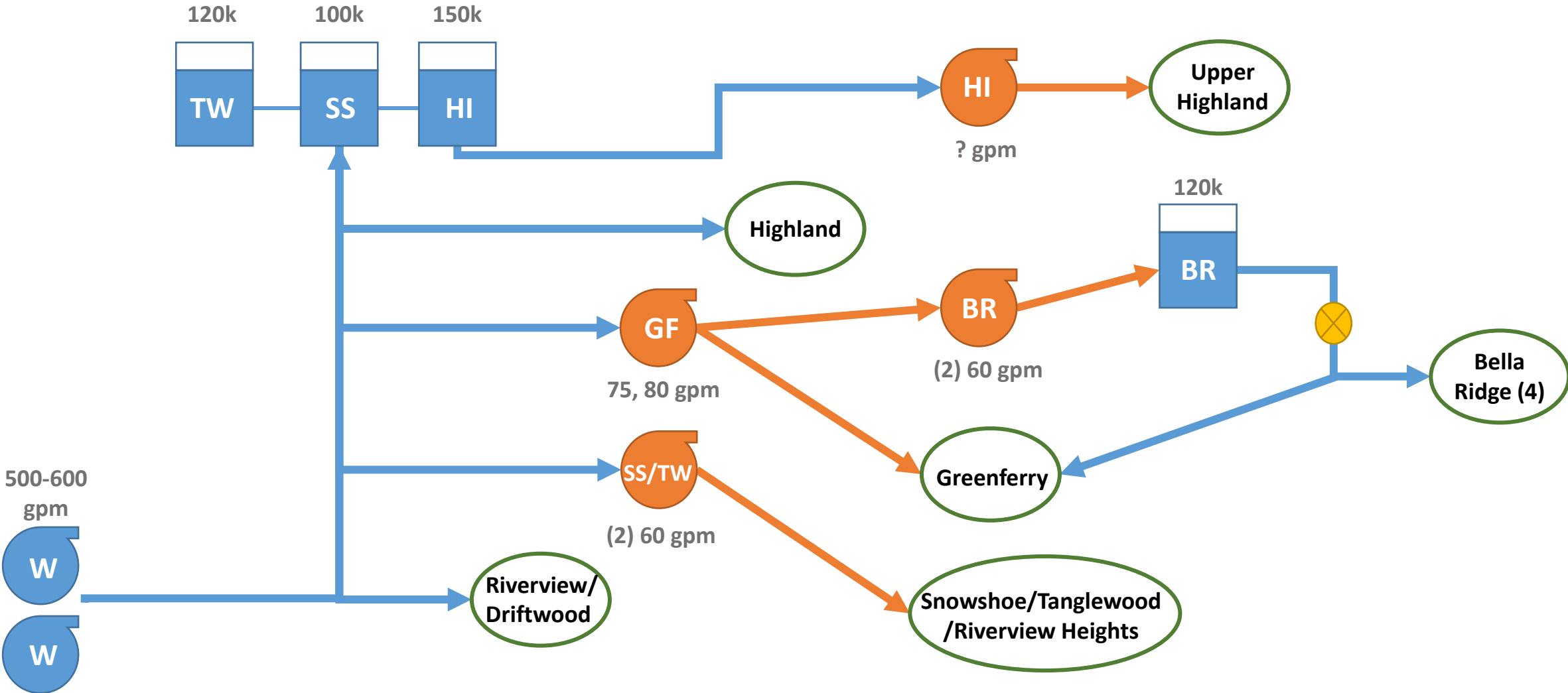
Existing System Overview

Existing System Overview

Map provided by ACE



Existing Facilities



Capacity Analysis

Capacity Analysis

- Source
- Booster – No change
- Storage
- Distribution
- Summarize Deficiencies

Source

Current Source Capacity:

- Well 1: 538 gpm
- Well 2: 602 gpm

Total with Largest Source Offline: 538 gpm

Source Capacity (gpm)	EDUs	Current MDP + EQ (gpd)	Available Source Capacity with Largest Source Down (gpd)	Source Capacity Surplus or Deficit (-) (gpd)	Source Capacity Surplus or Deficit (-) (gpm)
Well Production (1,140 gpm)	377	731,672	774,720	43,048	30

*Total EDUs that can be served: 399

Source – Water Rights

- Existing Licenses

95-8613	2/9/1989	1 cfs
95-9082	5/5/2004	1 cfs
		1.25 cfs total

- Permit, Beneficial Use due 12/1/2023

95-9531	8/25/2008	0.8 cfs
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- Application, RAFN

95-17116	2/19/2015	4.63 cfs
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Storage

Current Storage Capacity:

- Highland: 150,000 gallons
- Snowshoe: 100,000 gallons
- Tanglewood: 120,000 gallons
- Bella Ridge: 120,000 gallons

	EDUs	Operating Storage (gallons)	Dead Storage (gallons)	Equalization Storage (gallons)	Standby Storage (gallons)	Fire Suppression Storage (gallons)	Total Storage Required (gallons)	Total Storage Available (gallons)	Storage Surplus or Deficit (-) (gallons)
Greenferry	333	24,974	145,220	53,724	65,452	180,000	469,370	370,000	-99,370
Bella Ridge	44	6,857	0	8,762	8,648	180,000	204,267	120,000	-87,267
Bella with Old FF	44	6,857	0	8,762	8,648	120,000	144,267	120,000	-24,267

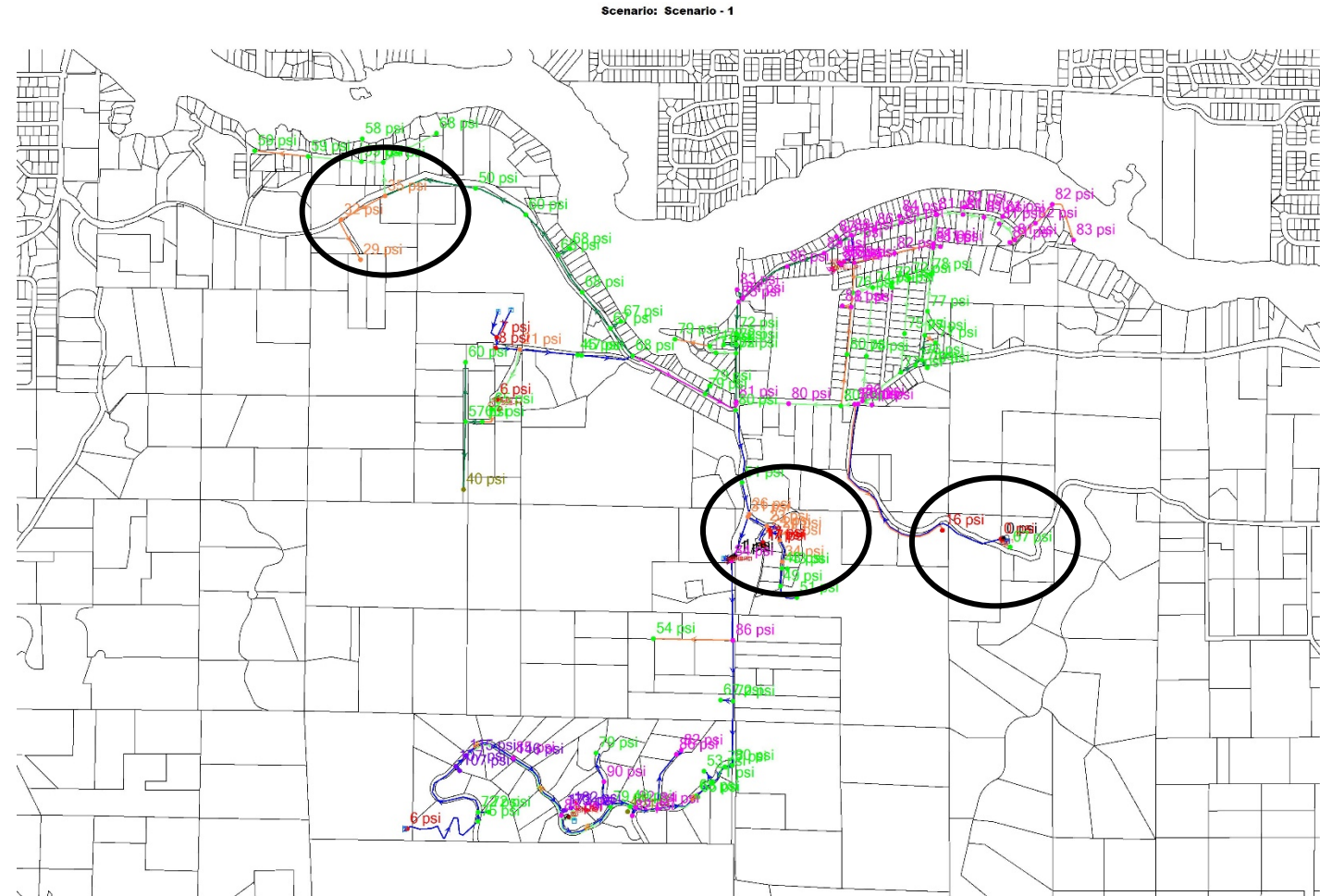
Distribution System

- Hydraulic Model Development
 - Import from ACE, challenges due to different program used
 - Allocated demand based on billing records
 - Incorporated line upsizing occurred
- Model Scenarios
 - Scenario 1: PHD with Operational Storage and Equalization Storage Depleted, maintain 40 psi
 - Scenario 2: Fire flow, while meeting MDD with Operational, Equalization, and Fire Suppression Storage Depleted, maintain 20 psi (modeling end of fire fight)

Distribution System

- Results

- Scenario 1: Meets requirements except at
 - Riverview South: 29 – 35 psi
 - Cedar Creek: 17 – 51 psi
 - Upper Highland: 16 psi



20201105 CleanFerry Model.vtg
12/14/2020

Bentley Systems, Inc. Hydraulics Solution Center
275 Devon Company Drive Suite 203 W. Watertown, CT 06795 USA +1-203-755-1868

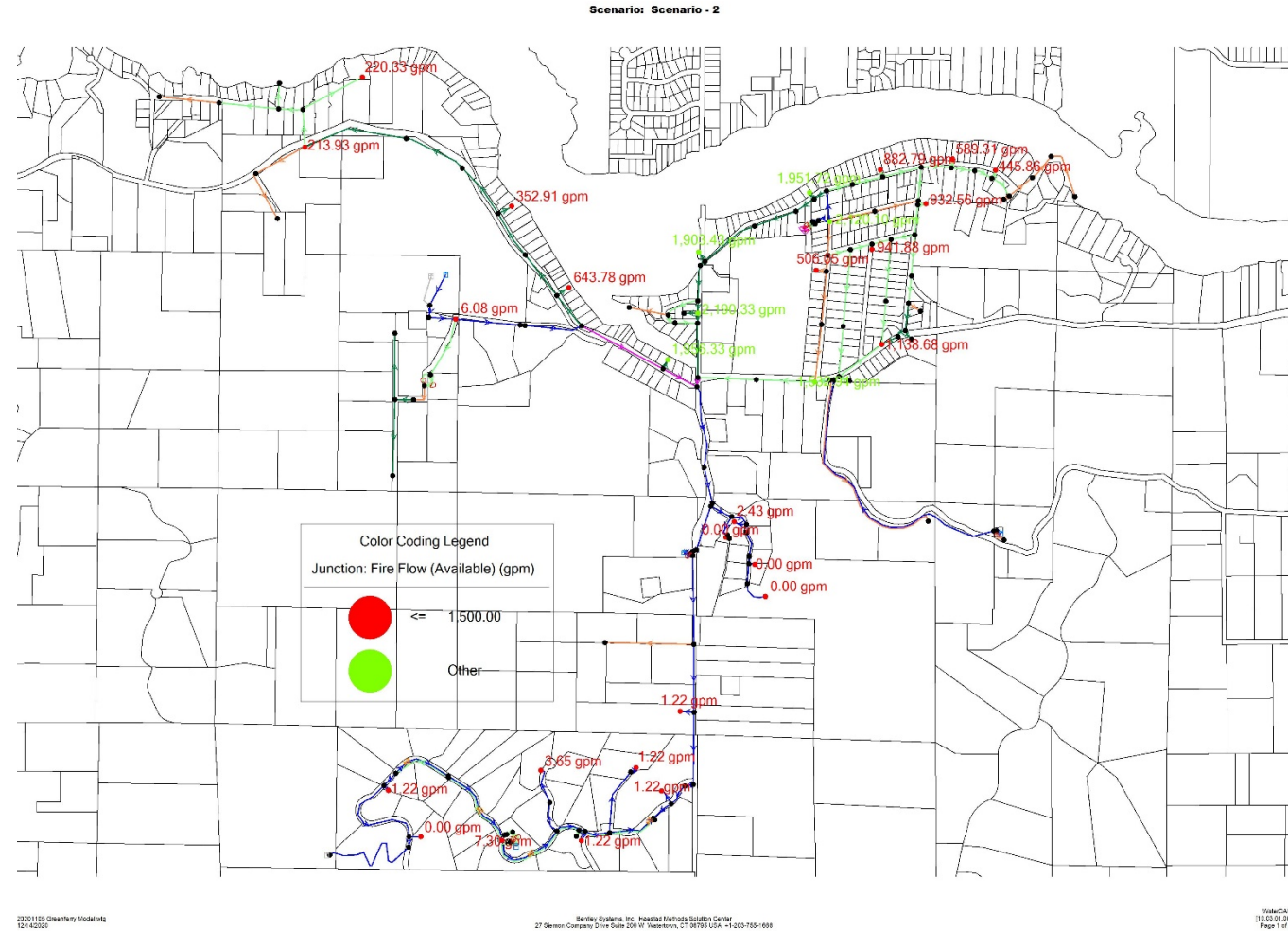
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Distribution System

- Results

- Scenario 2: Cannot meet Fire Flow

- Ranges: 0.00 – 2,190 gpm
- Deficient Areas:
 - Bella Ridge: 0.00 – 7.30 gpm
 - Cedar Creek: 0.00 – 2.43 gpm
 - Riverview South: 214 – 220 gpm
- Taking Upper Highland off fire flow



Current Deficiencies

- Booster Deficiencies –
 - Highland Booster Station – (-)5 gpm
- Storage Deficiencies –
 - Main Datum – (-)99,370 gal
 - Bella Ridge – (-)24,267 gal to (-)84,297 gal
- Distribution System –
 - Peak Hour – Riverview South, Upper Highland and Cedar Creek
 - Fire Flow – widespread throughout system

Growth Projections

Growth Scenarios

- Growth A: Current Will Serves: Riverview Heights and Bayshore
- Growth B: Properties within District not currently served
- Growth C: Properties within District not currently served, subdivided to minimum lot size (buildout within District boundary)

Growth Scenario	Current	Growth A	Growth B	Growth C
Additional EDUs	-	84	91	67
Total EDUs	377	461	552	703

Future Demand

- Growth Rate: Assumed 2% as documented in ACE's report

Growth Scenario	Year	EDUs	ADP (gpm)	MDP (gpm)	PHP (gpm)
Current	2020	377	154	458	1,015
10-Year	2030	460	188	559	1,238
Growth A	2031	461	189	561	1,241
Growth B	2040	552	226	671	1,507
20-Year	2040	560	229	681	1,486
Growth C	2053	703	288	855	1,892

Future Demand - RAFN

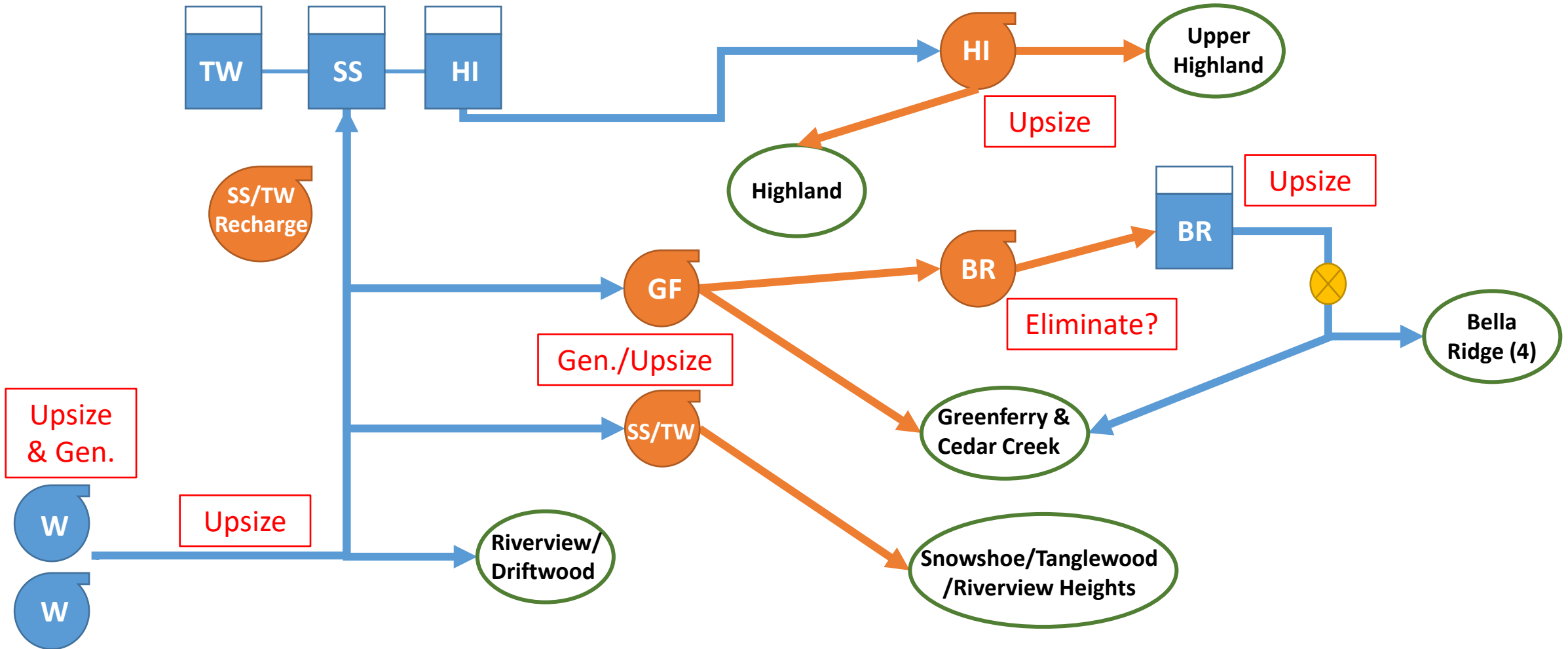
- Projection by IWRRI, filed in 2015 for 30-year development period (2045)
 - 4,800 population
 - MDD = 3,000 gpm, PHD = 6,000 gpm
 - Total Water Right Needed: 6.68 cfs
- Current Projection based on Facility Plan for 2045
 - 1,517 population (based on EDUs and people per household)
 - MDD = 753 gpm, PHD = 1,666 gpm
 - Total Water Right Needed: 1.68 cfs
- Water Right Needed for Growth C: 1.90 cfs

Summary of Future Capacity

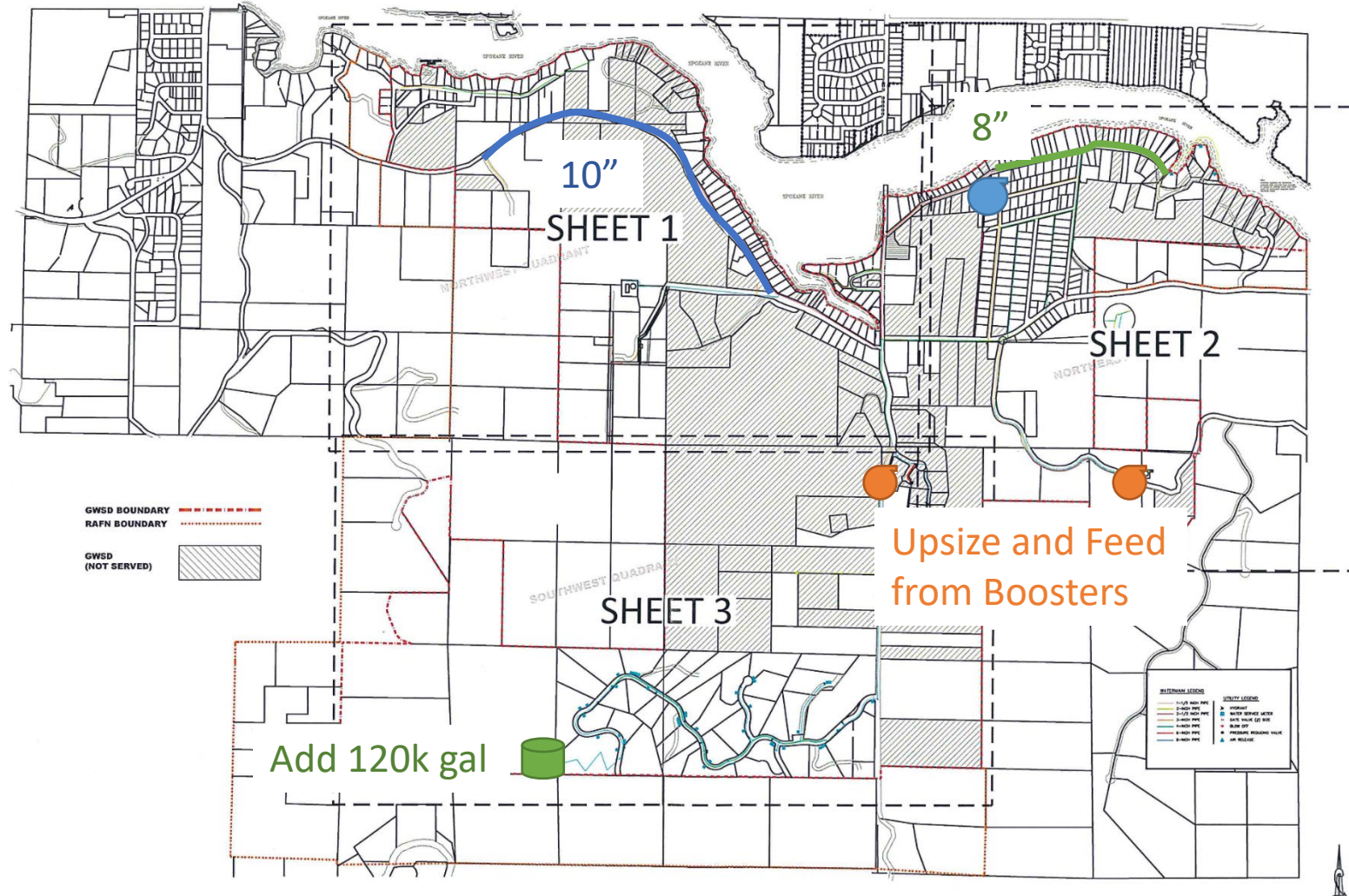
	Current	Growth A	Growth B	Growth C
Source	30 gpm	-83 gpm	-220 gpm	-444 gpm
Boosters				
Snowshoe/Tanglewood	20 gpm	-53 gpm	-69 gpm	-77 gpm
Greenferry	15 gpm	15 gpm	-15 gpm	-43 gpm
Bella Ridge	0 gpm	0 gpm	-30 gpm	-58 gpm
Highland	-5 gpm	-5 gpm	-5 gpm	-5 gpm
Storage				
Greenferry	-99,370 gal	-149,789 gal	-204,410 gal	-292,044 gal
Bella Ridge	-24,267 to -84,267 gal	-84,267 gal	-84,267 gal	-86,668 gal
Distribution	Peak Hour constraints at Riverview South, Upper Highland and Cedar Creek Fire Flow unavailable at full requirement throughout system			

Proposed Improvements

Proposed Facilities



Proposed Facilities (Welch Comer)



Proposed Facilities (Source)

- Upsize Wells and Add Generators (to wells and boosters)
 - Provide more source capacity
 - Eliminates standby storage requirement
 - Options:
 1. Well Pump Upsize: 950 gpm each (Growth C)
 - Adds 306 connections, total 705
 - Check proximity to nearby septic systems
 2. Add Well No. 3: 600 gpm
 - Adds 445 connections, total 844
 - Review potential sites

Proposed Facilities (Storage)

- Add Storage at Bella Ridge – 120,000 gallons
- Per ACE
 - Replace Highland Reservoir
 - Install SCADA

Proposed Facilities (Booster/Distribution)

- Per ACE: Greenferry Bypass
 - Improves fire flow below bypass by up to 200 gpm
- Upgrade Transmission on Riverview to 10-inch minimum
 - Combined with Crystal Bay upgrades
 - Addresses pressure and fire flow at Riverview South
 - Possible Alternate – Install Tank South of Riverview (on hill)
 - Challenges: acquiring site, site elevation, controls with existing tanks
- Upgrade Distribution on Greensferry between (north of Wells) to Granite Point to 8-inch minimum
 - Addresses fire flow

Proposed Facilities (Booster/Distribution)

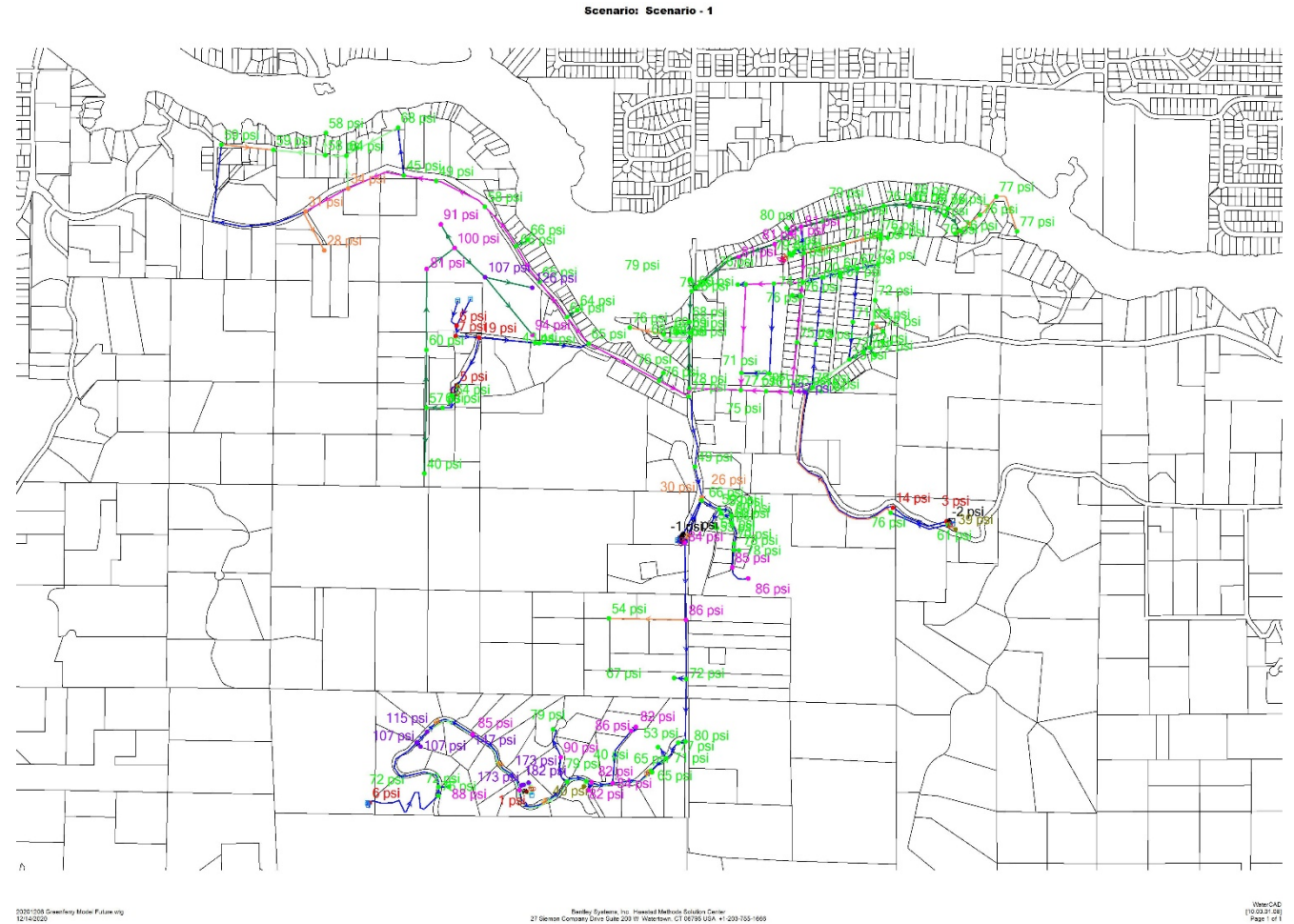
- Address Pressure and Fire Flow issues at Upper Highland and Cedar Creek
 - Cedar Creek (increase pressure and fire flow):
 - Add 3rd pump to Greenferry Booster and install boosted pressure line from booster to Cedar Creek
 - Bypass can be used for fire flow
 - Alternate Solution Per ACE – Greenferry Bypass with dual PRV and/or Greenferry Booster Station Relocation
 - Upper Highland (eliminate dead storage at Highland Reservoir):
 - Raise elevation of Highland Tank or relocate to higher elevation – **creates hydraulic issues**
 - Upsize Upper Highland Booster and install boosted pressure line from booster to Highland service (3-inch); add fire pumps for fire flow (consult with Fire District)
 - Repurpose Highland Recharge Booster (proposed by ACE) to include service and fire pumps

Proposed Facilities (Booster/Distribution)

- Per ACE
 - Transmission from Wells to Greensferry Road
 - Crystal Bay Upgrades
 - Greenferry Terrace Upgrades
 - Snowshoe/Tanglewood Upgrades

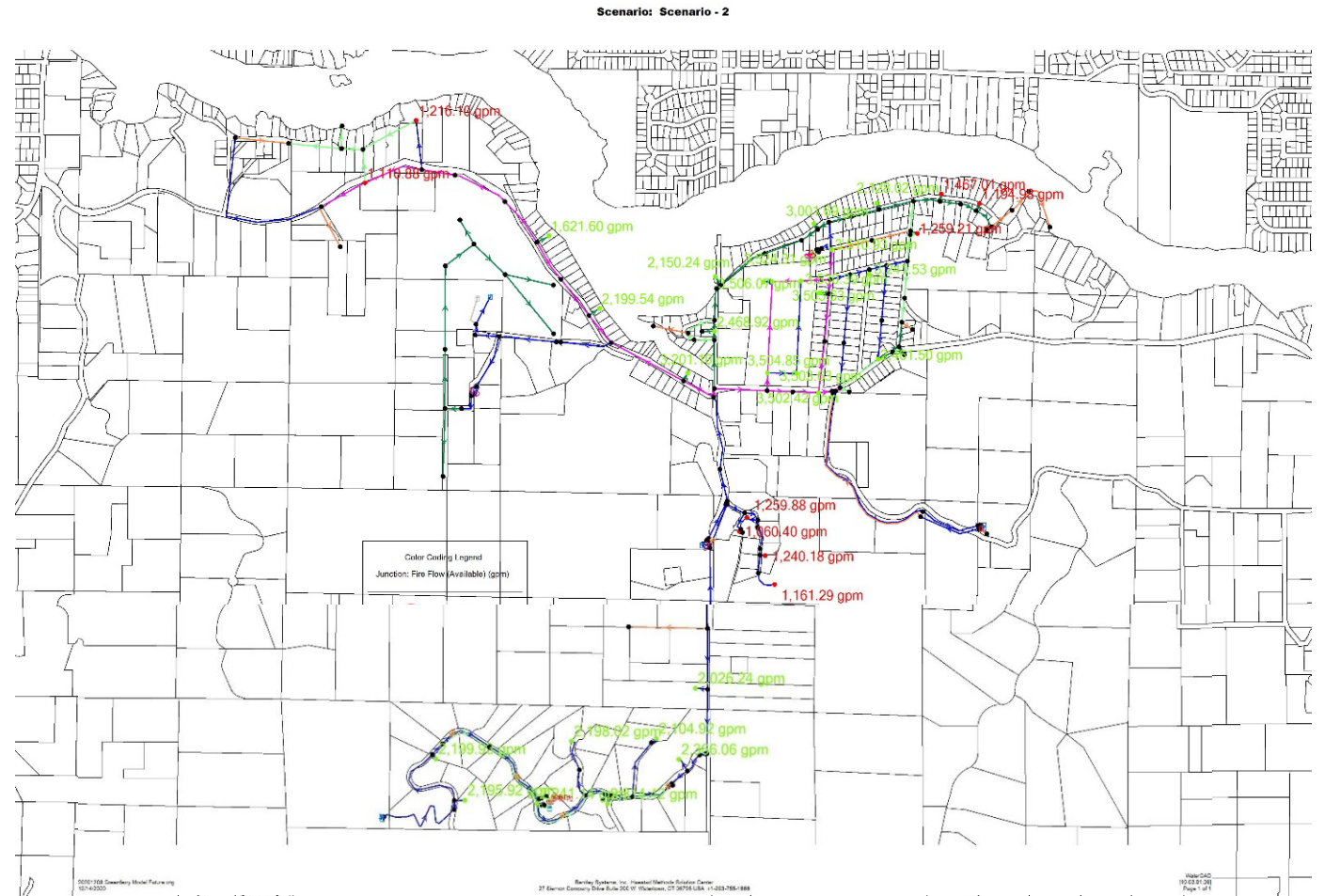
Proposed Facilities (Model Results)

- Scenario 1: Meets requirements
 - Reduces high pressure in Terraces
 - Increases pressure in low areas



Proposed Facilities (Model Results)

- Scenario 2: Meets requirements
 - Ranges: 1,100 – 2,650 gpm
 - Cedar Creek, Terraces over 1,000 gpm – likely acceptable due to when the systems were approved by Fire District



Proposed Capital Improvement Plan

	Description	WC/ACE	Estimated Cost	Short-Term	Long-Term
Source	Well Pump Replacement / New Well	WC	\$945,000	X	
	Generators	ACE	\$140,900	X	
Storage	Bella Ridge Expansion	WC	\$357,000	X	
	Highland Replacement	ACE	\$280,000		X
	SCADA Upgrades	ACE	\$99,160		X
Booster	Upper Highland Booster Exp	WC	\$500,700	X	
	Greenferry Booster Exp	WC	\$210,700	X	
	Greenferry Bypass	ACE	\$95,000	X	
	Riverview Upsize	WC	\$1,170,400		X
	Greenferry Upsize	WC	\$449,100		X
	Transmission from Wells to Greensferry Rd	ACE	\$498,125	X	
	Crystal Bay Upgrades	ACE	\$1,102,440		X
	Greenferry Terrace Upgrades	ACE	\$1,055,687	X	
	Snowshoe/Tanglewood Upgrade	ACE	\$637,020		X
Maintenance	Easement	ACE	\$50,000		X
Total			\$7.6 million	\$3.8 million	\$3.8 million

Bayshore

- Existing Will Serve
 - Transmission (10”) and looping
 - Land for Highland Booster Site and Well Site
- Proposed Addition
 - Participate in capacity improvements to source through Mitigation Fee
 - Well Pump Replacement
 - Estimated \$700,400 for 306 connections = \$2,288.89 per connection
 - Total of approximately \$130,446.67
 - Add Well
 - Estimated \$945,000 for 445 connections = \$2,123.60 per connection
 - Total of approximately \$121,44.94

IDEQ Process - Schedule

	2020			2021												2022			
	N	D		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A
Complete Draft		█	█	█															
Submit Draft to District				█															
Address comments					█														
Submit Draft to IDEQ						█	█	█	█	█	█	█	█	█	█	█			
IDEQ Review						█	█	█	█	█	█	█	█	█	█				
Address comments										█									
Technical Approval												█							
Public Meeting													█						
Public Comment Period													█	█					
Board Meeting to Adopt														█					
Final Draft to IDEQ															█				
Environmental															█	█	█	█	
Grant Closeout																			█

IDEQ Process – Approvals for Projects

- Greenferry Bypass Project has been approved
- Greenferry Terraces Project
 - Submit Facility Plan to IDEQ
 - IDEQ will review modeling section to coordinate with Plans & Specifications review
- Well Pump Replacement Upgrade
 - Submit Test Pump Procedure
 - Conduct Test Pumping
 - Prepare Design Plans & Specifications
 - IDEQ could approve directly after “conditional approval” of Facility Plan

Next Steps

- Confirm/update recommended alternatives by Dec. 21st meeting
 - Well Investigation – test pump procedure to IDEQ?
- Prepare written report and submit to District by early January
- Finalize written report and submit to IDEQ by mid to late-January
- Coordinate with Bob Haynes on RAFN, if requested

Extra Slides

Terminology

Equivalent Dwelling Unit (EDU):

- A unit of measure that standardizes all land use types (housing, retail, office, etc.) to a level of demand created by a single-family detached housing unit within a water system

Examples:

- Typical single-family household uses 300 gallons per day (i.e. 1 EDU = 300 gpd)
- Commercial connection uses 600 gallons per day, the commercial accounts for 2 EDUs

Terminology

Demand:

- Average Daily Demand (**ADD**): average volume of water calculated over the year
- Maximum Daily Demand (**MDD**): maximum gallons of water used in one day
- Peak Hourly Demand (**PHD**): maximum gallons of water used in one hour

Production:

- Average Daily Production (**ADP**): average volume of water produced over the year
- Maximum Daily Production (**MDP**): maximum volume of water produced in one day
- Peak Hourly Production (**PHP**): maximum gallons of water produced in one hour



Overview of Pertinent Rules

IDAPA 58.01.08



Source

Supply PHD with largest source offline or MDD plus equalization storage with largest source offline

Booster Facilities

- Supply MDD plus Fire Flow (if pumped) with any pump out of service
- Supply PHD with any pump out of service

Storage

- Operational Storage: volume allocated to pump control
- Equalization Storage: volume to supply PHD over 150 min.
- Standby Storage: volume to supply 8 hours of average day demand (not required with generators)
- Fire Suppression: volume specified by local fire authority
 - 1,500 gpm for 2 hrs
 - (past) 1,000 gpm for 1 hr

Distribution

- Water mains with Fire Hydrants shall not be less than 6-inch diameter
- Water mains without Fire Hydrants shall not be less than 3-inch diameter
- Maintain 40 psi minimum pressure throughout system during PHD
- Maintain 20 psi minimum pressure throughout system during MDD plus Fire Flow