



June 15, 2020

# Lynnfield Center Water District

Special District Meeting

**CDM  
Smith**

LCWD Today and possibilities for Tomorrow

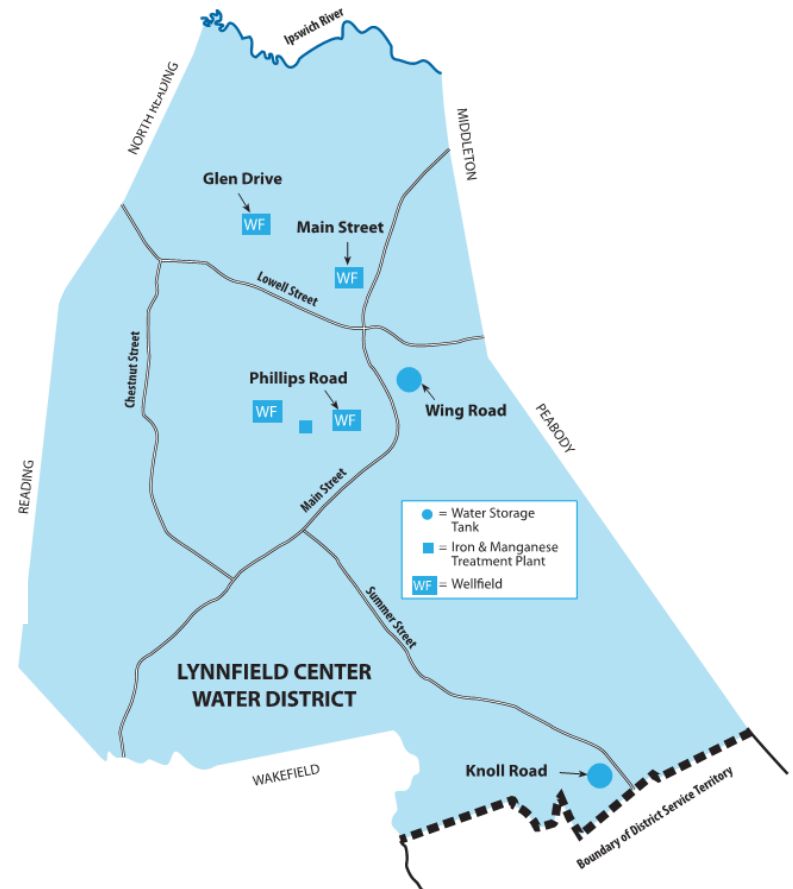
# Agenda

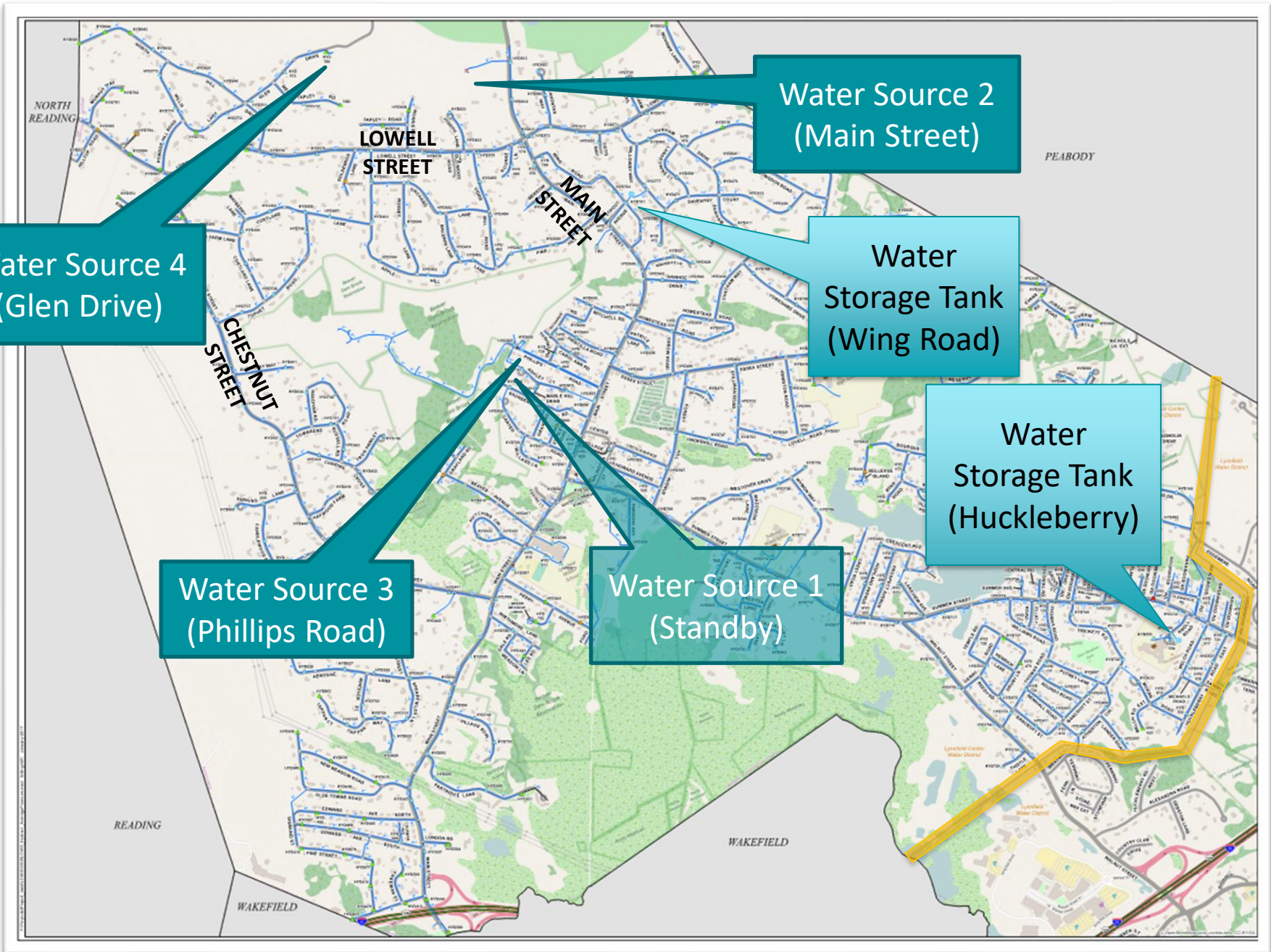
- Welcome by LCWD Superintendent
- Overview of District's Water System
- Progress Made in FY20
- Big Picture & Long-Term Solutions



# Overview of District's Water System

- Sources: four groundwater well sites (three active, one standby)
- Treatment: treatment plant and at pump stations
- Storage: two water storage tanks
- Distribution: 48 miles of water main
- Questions from Audience





Water Source 4  
(Glen Drive)

Water Source 2  
(Main Street)

Water  
Storage Tank  
(Wing Road)

Water  
Storage Tank  
(Huckleberry)

Water Source 3  
(Phillips Road)

Water Source 1  
(Standby)

# Progress Made in FY20

- Water Storage Tank Inspections
- WTP Filter Inspections
- Well Redevelopment
- Well Pump Energy Study
- Additional Hydrant Flushing
- Apple Hill Study
- Additional Water Sampling



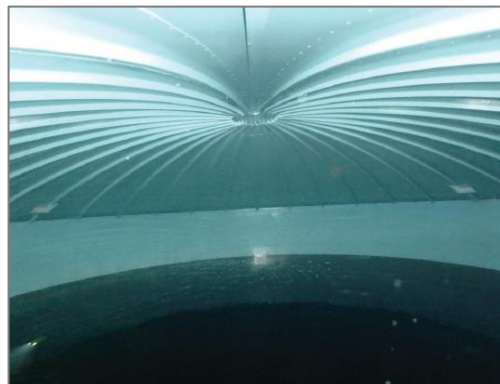
Main Street Well Rehab

# Water Storage Tank Inspections

- Wing Rd & Knoll Rd Tanks Inspected **November 2019**
- Sediment found in Wing Rd
- **FY21 Recommendations:**
- Wing Rd – Clean & Paint Interior
- Knoll Rd - Paint exterior (overcoat)



Wing Road

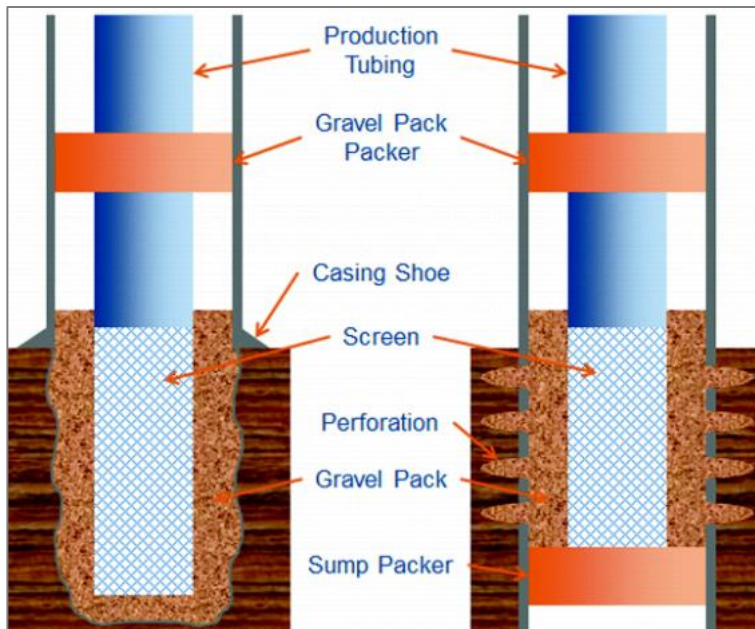


Knoll Road



# Well Redevelopment (Cleaning)

- Main St & Phillips Rd **Gravel Packed** wells cleaned this Spring
- Well screens clog over time with mineral buildup
- Cleaning restores yield and improves water quality



# Water Treatment Plant (WTP) Filter Inspections

- Phillips Road WTP treats for Iron and Manganese by “Green Sand Filters”
- “Green Sand” is chemically treated sand that attracts mineral ions to enhance filtration
- Filter vessels were inspected for performance and cleaned this Spring





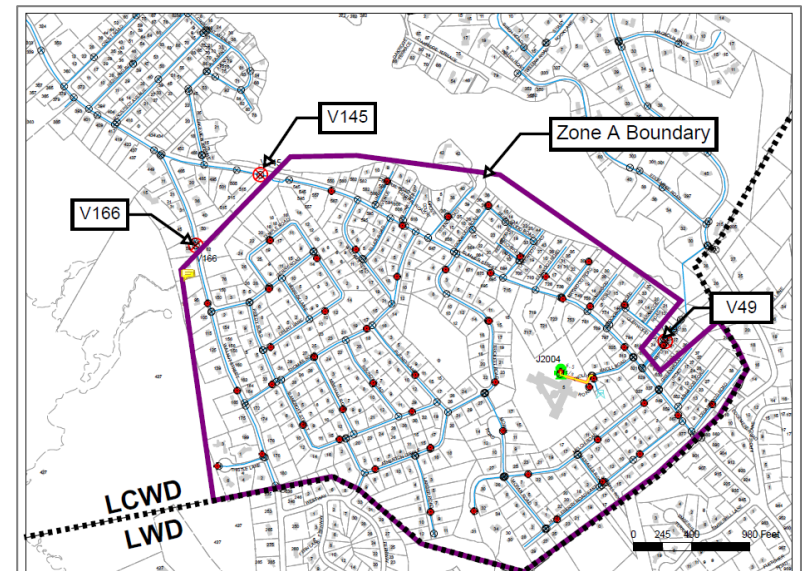
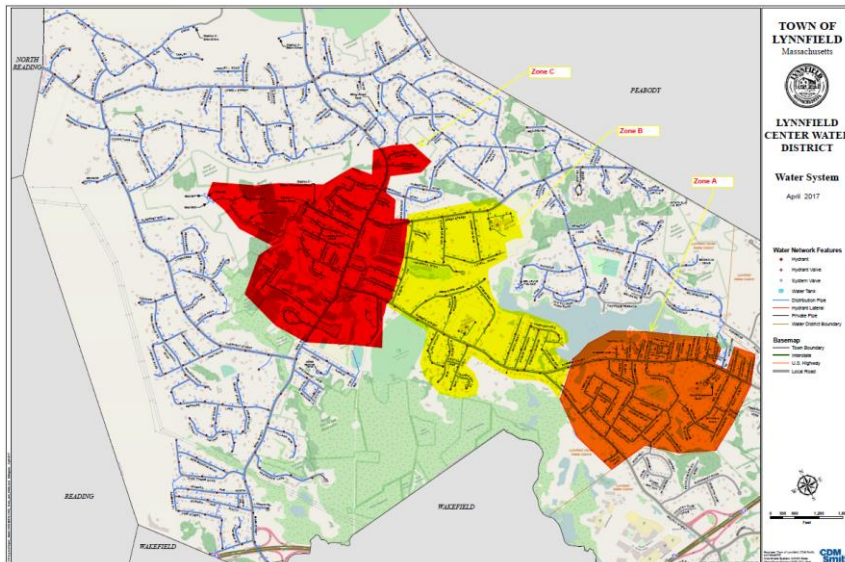
# Well Pump Energy Study

- Each well is run by a pump that is either 'on' or 'off'
- A Variable Frequency Drive (VFD) allows pumps to run at different speeds
- VFDs increase energy efficiency
- Glen Dr & Phillips Rd wells assessed for future VFDs
- Possible grant from RMLD to install these

Measure	Cost	Savings		Payback (years)
		kWh	\$	
Glen Dr. Control Valve	\$ 5,320	9,315	\$ 1,332	4.0
Glen Dr. Pump VFD	\$ 24,438	22,916	\$ 3,277	7.5
Phillips Rd. Pump VFD	\$ 32,667	24,308	\$ 3,476	9.4
<b>Total</b>	<b>\$ 62,425</b>	<b>56,539</b>	<b>\$ 8,085</b>	<b>7.7</b>

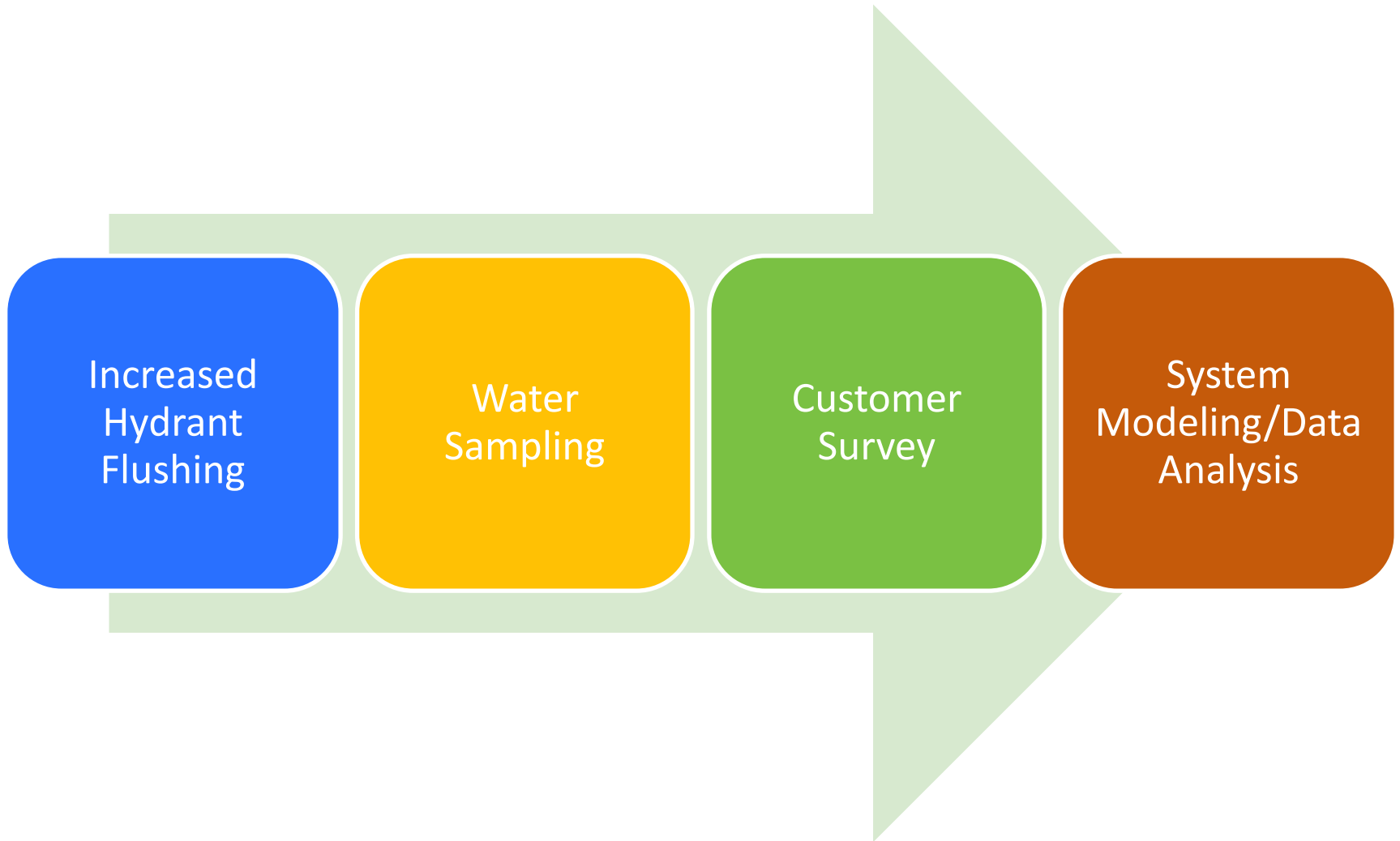
# Hydrant Flushing - Zone A

- Apple Hill area has been flushed each spring
- Flushing program to be expanded to entire district
- “Zone A” was developed this Spring



# Apple Hill Neighborhood Study

## Four Elements of Study



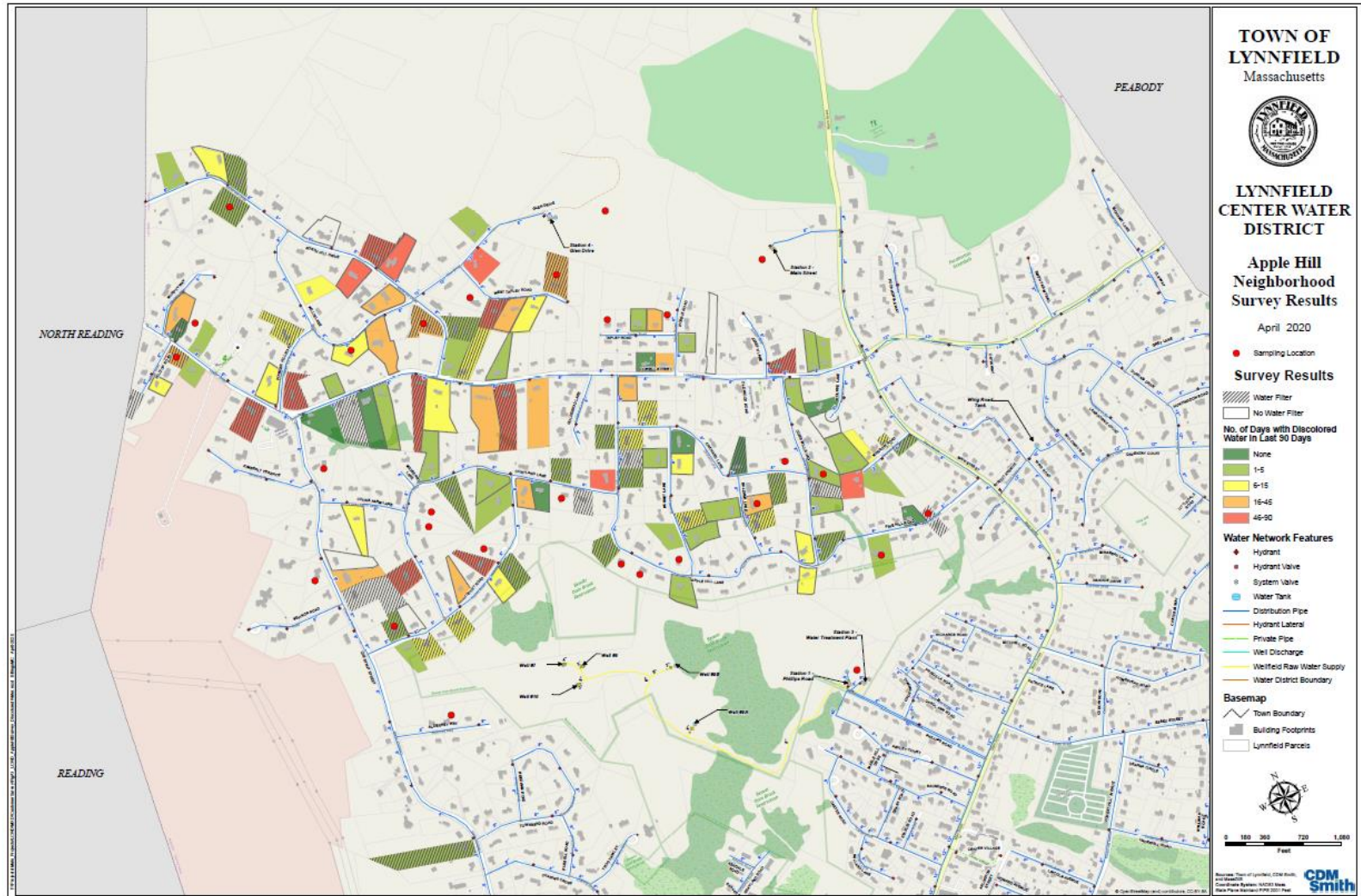
# Apple Hill Neighborhood Study

## Results – Water Sampling

- 3 rounds of sampling in October and November 2019 at 25+ locations
- 3 locations exceeded secondary limit for Manganese (taste, color, odor)
- Concentrations are highest near Glen Drive
- As water ages, Mn precipitates out of solution; less impact on customers

# Apple Hill Neighborhood Study

## Results – Water Sampling



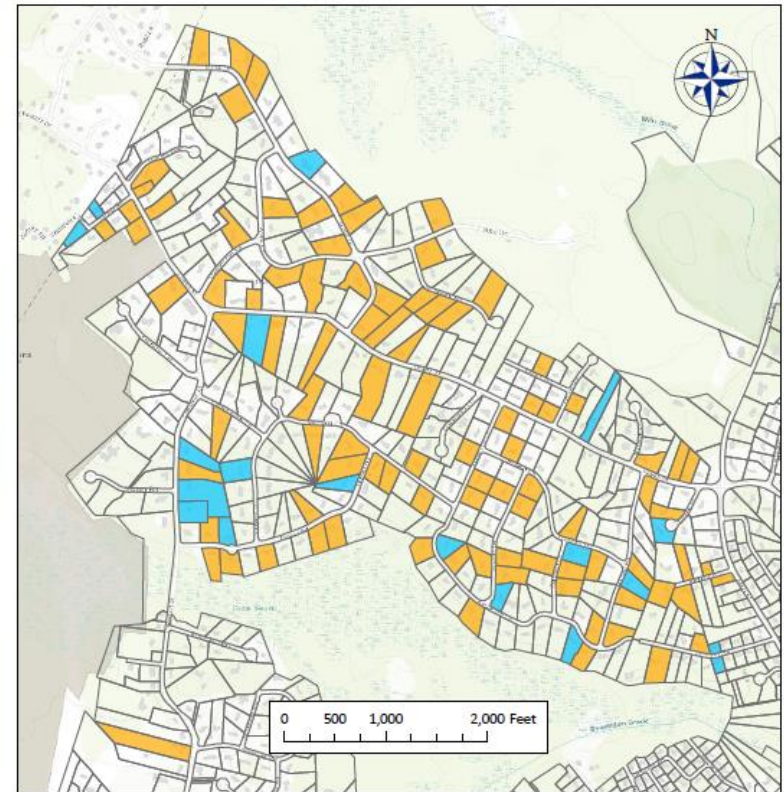
# Apple Hill Neighborhood Study

## Results – Customer Survey

Lynnfield Center Water District  
Survey Results 01/17/2020



- 360 Surveys mailed to Customers
- 115 responses (32%)
- Discolored water #1 response
- Wide-spread impacts
- Worst near Glen Drive Well



Discolored, cloudy, or poor-tasting water?

- Yes
- No
- No response



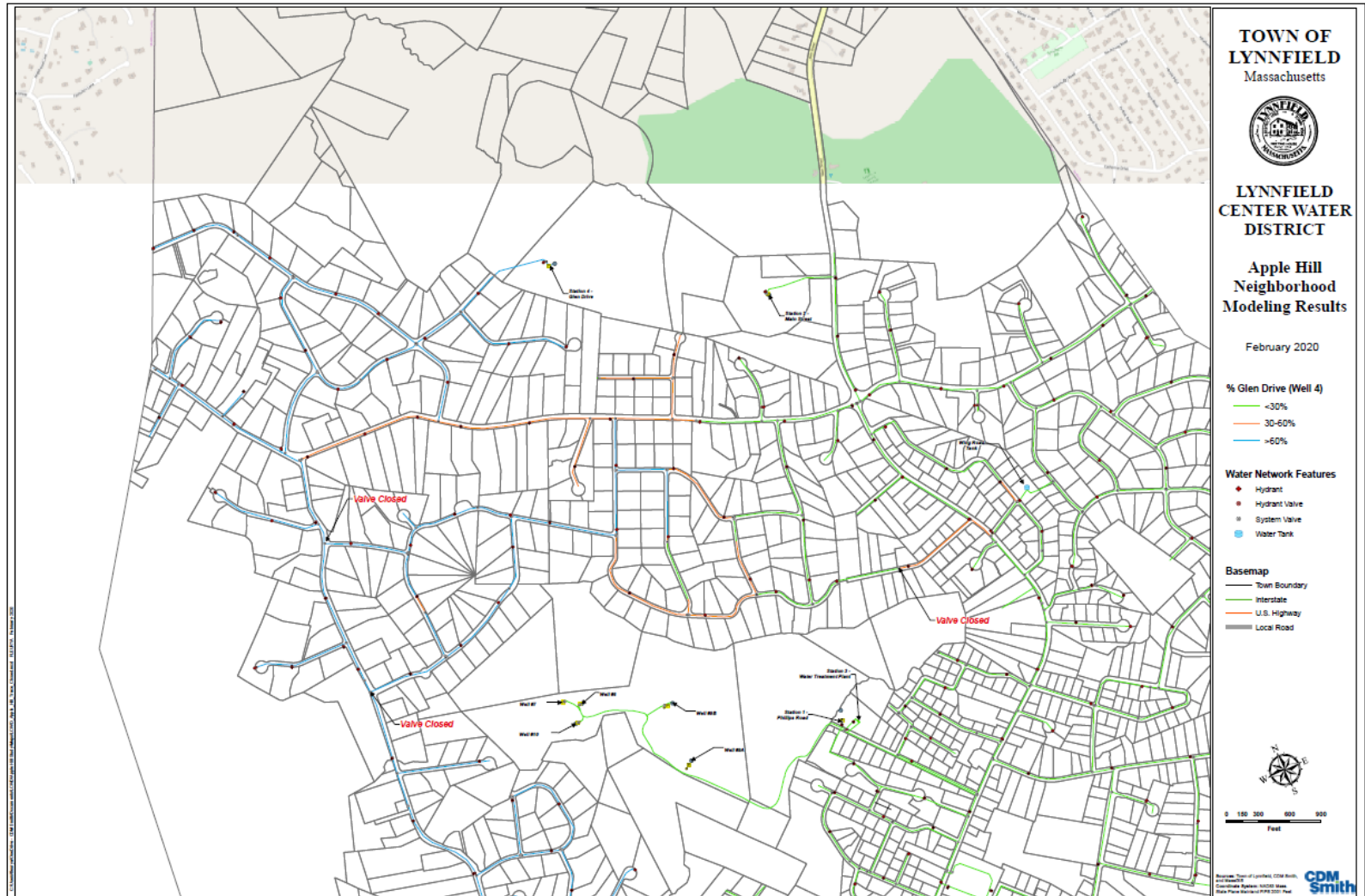
# Apple Hill Neighborhood Study

## Results – Modeling Water Quality

- 12 Blending Scenarios evaluated
- Discolored water cannot be alleviated through valving changes alone
- Wing Rd Tank helps collect Fe and Mn Sediment
- Source must be treated or source changed
- (map on next slide)

# Apple Hill Neighborhood Study

## Results – Modeling Water Quality

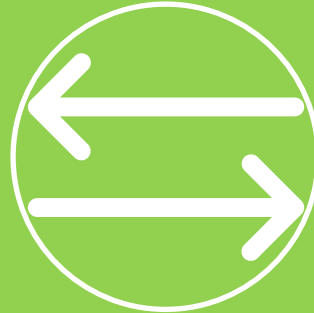




# Big Picture and Long-Term Solutions



All Water from  
LCWD



Improvements to  
LCWD and  
Supplemental  
Water from MWRA



All Water from  
MWRA



Option	1	2A	2B	3	4	5A	5B
	<ul style="list-style-type: none"> <li>Maintain existing assets (options 1-4)</li> </ul>	<ul style="list-style-type: none"> <li>New WTP at Glen Dr, connect Main Street</li> </ul>	<ul style="list-style-type: none"> <li>New WTP at Glen Dr</li> <li>Upgrades at Phillips Rd (STA 1)</li> </ul>	<ul style="list-style-type: none"> <li>New WTP at Glen Dr</li> <li>Upgrades at Phillips Rd (STA 1)</li> <li>~25% MWRA Water From LWD</li> </ul>	<ul style="list-style-type: none"> <li>Retire Glen D</li> <li>~50% MWRA Water From LWD</li> </ul>	<ul style="list-style-type: none"> <li>Retire all LCWD sources</li> <li>100% MWRA Water from LWD</li> </ul>	<ul style="list-style-type: none"> <li>Retire all LCWD sources</li> <li>100% MWRA Water from MWRA</li> </ul>
Quality	Not Achieved	Fully Achieved	Fully Achieved	Fully Achieved	Partially Achieved	Fully Achieved	Fully Achieved
Quantity	Not Achieved	Not Achieved	Partially Achieved	Partially Achieved	Fully Achieved	Fully Achieved	Fully Achieved
~Timeframe	1 - 2 years	2 - 5 years	2 - 5 years	3 - 5 years	5 - 7 years	6 - 8 years	6 - 8 years
Approx. Cost Range	\$1- 2M	\$7 - 8 M	\$8 - 9 M	\$10.5 - 12M	\$11 - 13M	\$20 - 22 M	\$18 - 20 M
Impact to Water Rate	<ul style="list-style-type: none"> <li>Capital Borrowing</li> </ul>	<ul style="list-style-type: none"> <li>Capital Borrowing (SRF Loan)</li> </ul>	<ul style="list-style-type: none"> <li>Capital Borrowing (SRF Loan)</li> </ul>	<ul style="list-style-type: none"> <li>Capital Borrowing (SRF Loan)</li> <li>MWRA &amp; LWD Rates</li> </ul>	<ul style="list-style-type: none"> <li>Capital Borrowing</li> <li>MWRA &amp; LWD Rates</li> </ul>	<ul style="list-style-type: none"> <li>Capital Borrowing</li> <li>MWRA &amp; LWD Rates</li> </ul>	<ul style="list-style-type: none"> <li>Capital Borrowing</li> <li>MWRA Rates</li> </ul>

**Legend:**

■ All Water from LCWD

■ Improvements to LCWD and Supplemental Water from MWRA

■ All Water from MWRA

■ Not Achieved

■ Partially Achieved

■ Fully Achieved

# Connections to Surrounding Communities

- Peabody – Lowell Street
- Wakefield – Main Street
- North Reading – Lowell Street

## Peabody:

Ipswich River Watershed – Yield Issues

New WTP under construction, likely no excess capacity

## Wakefield:

MWRA Water, Similar process to LWD

Hydraulics less favorable than LWD

## N. Reading:

Water from Andover; likely requires plant upgrades

Inter-basin transfer permitting

Extensive piping upgrades

# Option 1 – Maintain Existing System

## Future Projects

- Rehab existing water storage tanks
- Rehab backwash lagoon at Phillips WTP
- WTP station upgrades (HVAC)
- Deferred maintenance on Sta 3 Wellfield
- VFD Installations
- Emergency Back-up Power at Glen Dr & Main St

# Option 2A – New WTP at Glen Drive

- Existing Infrastructure projects still required
- Permit, design, and construct new WTP at Glen Drive
- Connect Main Street to new WTP
- 100% of source water would be treated
- No significant increase in Yield
- Very significant increase in water quality

**Challenges:** Significant seasonal water restrictions remain

## Option 2B – New WTP at Glen Drive + Upgrades at Phillips Road

- Existing Infrastructure projects still required
- New WTP at Glen Drive (100% treatment)
- Permitting Sta 1 to return to full service
- Upgrades to Sta 1 tubular wells
- Underground piping at Phillips Rd
- Upgrades within WTP

**Challenges:** Seasonal water restrictions

## Option 3 – Obtain ~25% from MWRA via LWD

- Existing Infrastructure projects still required
- New WTP at Glen Drive
- Upgrades at Phillips WTP (Sta 1 & 3)
- Upgrades within Existing LWD pump station
- LWD Water Main improvements
- LWD & LCWD Interconnection Building

**Challenges:** MWRA Permitting; LWD rate agreement; land purchase (interconnect)

## Option 4 – Obtain ~50% from MWRA via LWD

- Existing Infrastructure projects still required
- Upgrades at Phillips WTP (Sta 1 & 3)
- Decommission Glen Drive Wells
- Address future water quality issues at Main Street
- LWD pump station full replacement
- Additional LWD Water main improvements
- LWD & LCWD Interconnection Building

**Challenges:** MWRA Permitting; Land Purchase / Act of Legislature; Crossing Rt 1 (DOT permitting); LWD rate agreement



# Option 5A – Obtain 100% from MWRA via LWD

- Decommission existing tanks
- Decommission Phillips WTP (Sta 3)
- Decommission Main Street Wells
- Decommission Glen Drive Wells
- LWD Booster pump station full replacement
- LWD Water main improvements
- **Three** LWD & LCWD Interconnection Buildings

**Challenges:** MWRA Permitting; Land Purchase / Act of Legislature; Crossing Rt 1 (DOT permitting); LWD rate agreement; Extensive decommissioning

# Option 5B – Obtain 100% Water from MWRA through Direct Connection to MWRA

- Decommission existing tanks
- Decommission Phillips WTP (STA 3)
- Decommission Glen Drive Wells
- Decommission Main Street Wells
- **New Water Main Directly Connected to MWRA**

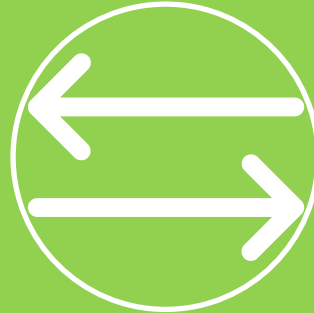
## Next Steps

- LCWD Board to vet and deliberate on Options
- Preferred Options will be further developed
- Detailed presentation this Fall for preferred Options
  - Costs, schedules, rate impacts, benefits
- Hold Special District Meeting for Authorization to Borrow

# Questions?



All Water from  
LCWD



Improvements to  
LCWD and  
Supplemental  
Water from MWRA



All Water from  
MWRA

