

I/I Reduction Flow Monitoring Results FY 18/19

Napa Sanitation District
Board of Directors Meeting
September 4, 2019



CSMP Overview

- Collection System Master Plan (CSMP) 2007
- Proposed capacity expansion projects
- Recommended 5-year I/I pilot program
- Delays in pilot program due to drought
- New CSMP in 2019 (December)



Sewer System Rehab

- I/I reduction
- Repair of failing sewers
 - Decrease O&M costs
 - Avoid unexpected failures
- Decrease/eliminate overflows
- In advance of paving projects



I/I Project Prioritization

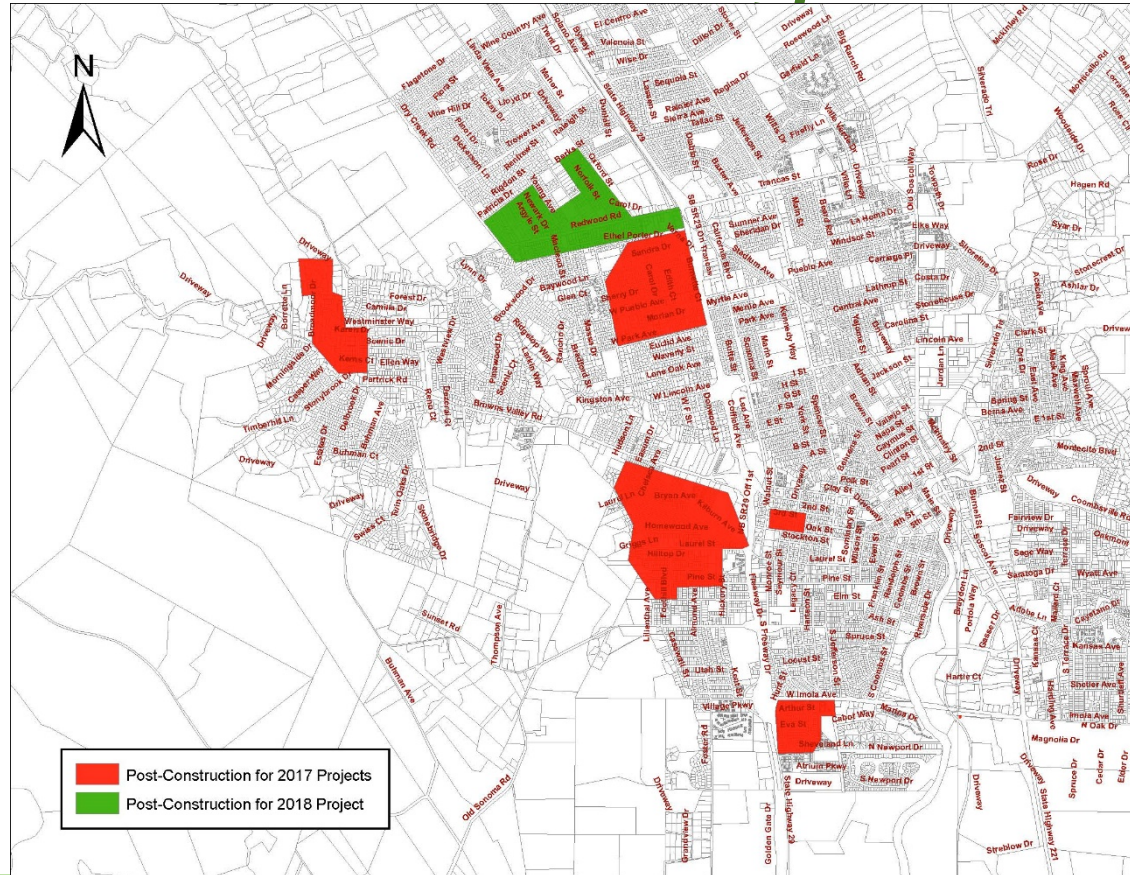
- Overflow locations
- Flow monitoring
- Nighttime reconnaissance
- Smoke testing
- Find the problem areas that result in an increase in success per dollar spent



I/I Reduction Program

- 8 major rehabilitation projects completed
- Pre- and post-construction flow monitoring
 - 18/19 monitoring
 - Post-construction Summer 2017 & 2018 projects
 - Pre-construction Upper lateral pilot projects

Flow Monitoring Areas





Annual Project Results

| Project Name | Year | Cost (\$M) | Project Size (miles) | Cost / Mile (\$M) | Peak Flow Rate Reduction (mgd) | Percent Peak Flow Rate Reduction | Cost to Reduce 1.0 mgd Peak Flow Rate (\$M) |
|---------------------------|------|--------------|----------------------|-------------------|--------------------------------|----------------------------------|---|
| Upper Alphabet Stonecrest | 2011 | 2.27 | 2.0 | 1.13 | 3.55 | 53% | 0.64 |
| Basin L#1 | 2012 | 1.81 | 1.7 | 1.05 | 1.40 | 34% | 1.29 |
| Basin L#2 | 2013 | 3.32 | 1.8 | 1.84 | 0.11 | 11% | 30.16 |
| Basin L#3 | 2014 | 3.50 | 2.5 | 1.40 | 1.45 | 26% | 2.42 |
| Basin L#4 | 2015 | 4.63 | 3.8 | 1.22 | 2.18 | 41% | 2.12 |
| Basin L#5 | 2016 | 2.22 | 1.5 | 1.50 | 1.20 | 69% | 1.85 |
| College/Minahen/Pine | 2017 | 4.60 | 5.2 | 0.88 | 0.81 | 20% | 5.67 |
| Oxford/Linda Vista | 2018 | 1.41 | 2.0 | 0.71 | 0.72 | 35% | 1.96 |
| TOTAL | | 23.76 | 20.5 | 1.16 | 11.42 | 37% | 2.08 |



Manhole Project Results

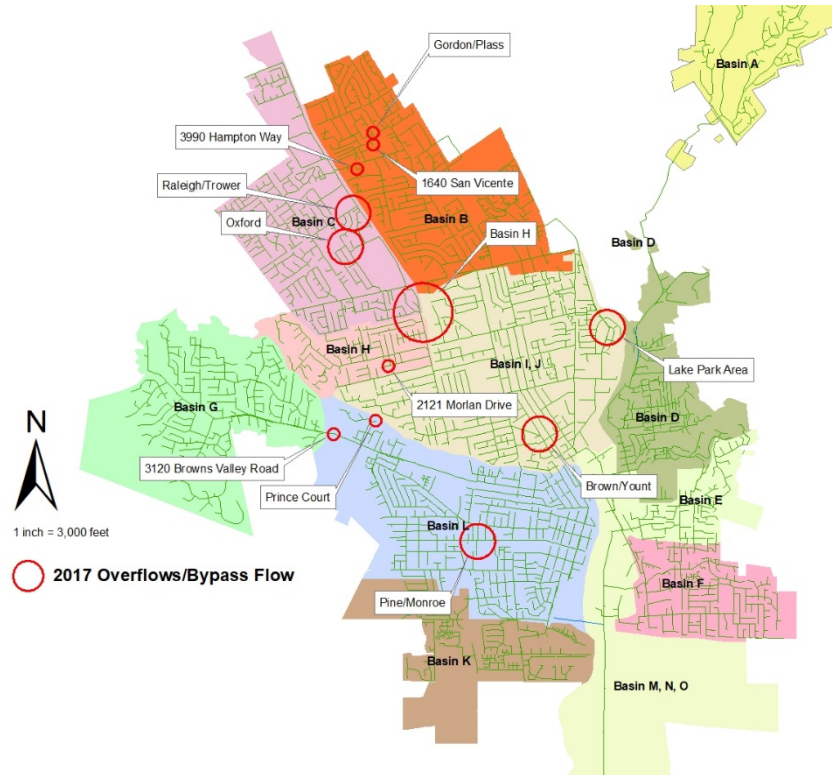
| Project Name | Year | Cost (\$M) | Peak Flow Rate Reduction (mgd) | Percent Peak Flow Rate Reduction | Cost to Reduce 1.0 mgd Peak Flow Rate (\$M) |
|-----------------------|------|------------|--------------------------------|----------------------------------|---|
| Nipak Basin L MH Ph 1 | 2011 | 0.06 | 1.08 | 17% | 0.06 |
| Nipak Basin L MH Ph 2 | 2016 | 0.10 | 0.90 | 17% | 0.11 |
| Westwood MH | 2017 | 0.19 | 0.84 | 19% | 0.22 |
| Nipak Basin H MH | 2018 | 0.19 | 1.99 | 44% | 0.10 |
| TOTAL | | 0.54 | 4.81 | 23% | 0.11 |



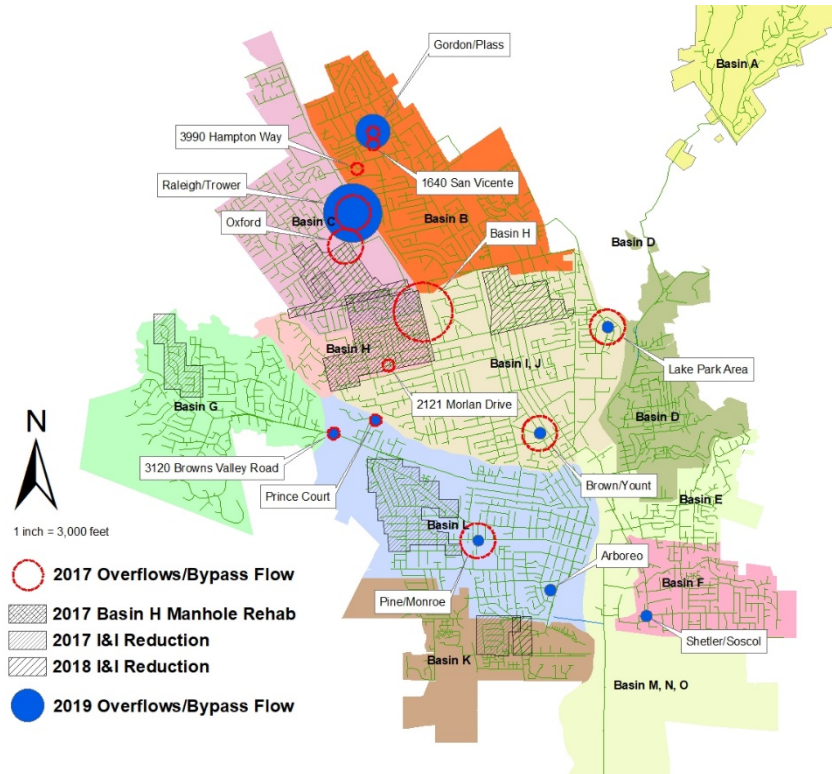
Lateral Project Results

| Project Name | Year | Cost (\$M) | Peak Flow Rate Reduction (mgd) | Percent Peak Flow Rate Reduction | Cost to Reduce 1.0 mgd Peak Flow Rate (\$M) |
|--------------------------------|------|------------|--------------------------------|----------------------------------|---|
| Upper Lateral #1 Spring Street | 2010 | 0.17 | 0.06 | 32% | 2.77 |
| Upper Lateral #2 Basin L - 1 | 2015 | 0.12 | 0.11 | 61% | 1.11 |
| Upper Lateral #3 Basin L - Oak | 2017 | 0.04 | 0.02 | 11% | 1.53 |

2017 SSO Locations



2019 SSO Locations





Analysis

- Variables that impact results
 - Percentage of system rehabilitation
 - Age of system
 - Pipe material
 - Soil conditions
 - Topography
 - Groundwater
 - Inflow



Program Results Summary

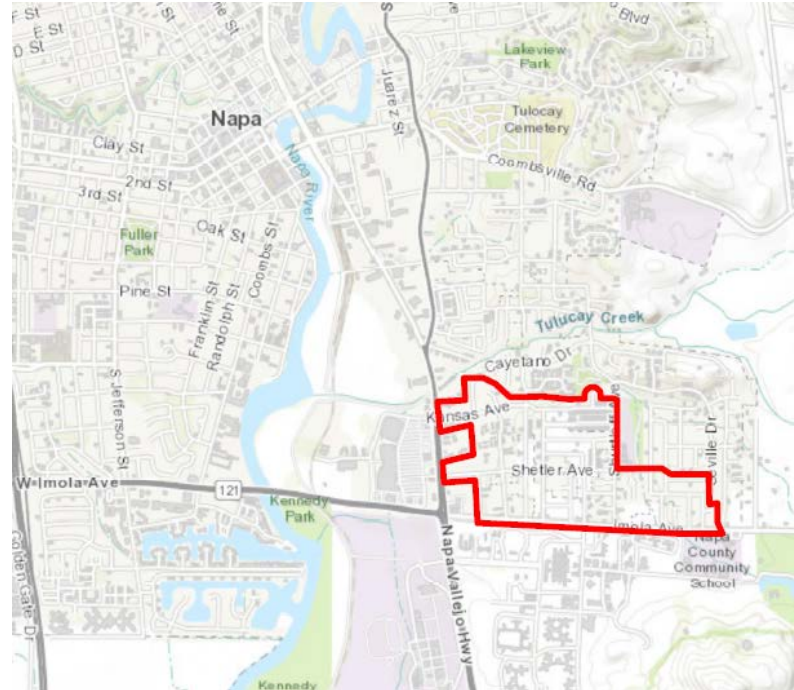
- I/I reduction of peak flow - 39%
- 8 major rehabilitation projects completed
- 16.4 mgd reduction
- Overflow (SSO) locations eliminated
- 25+ miles of pipe rehabilitated



Upcoming Projects

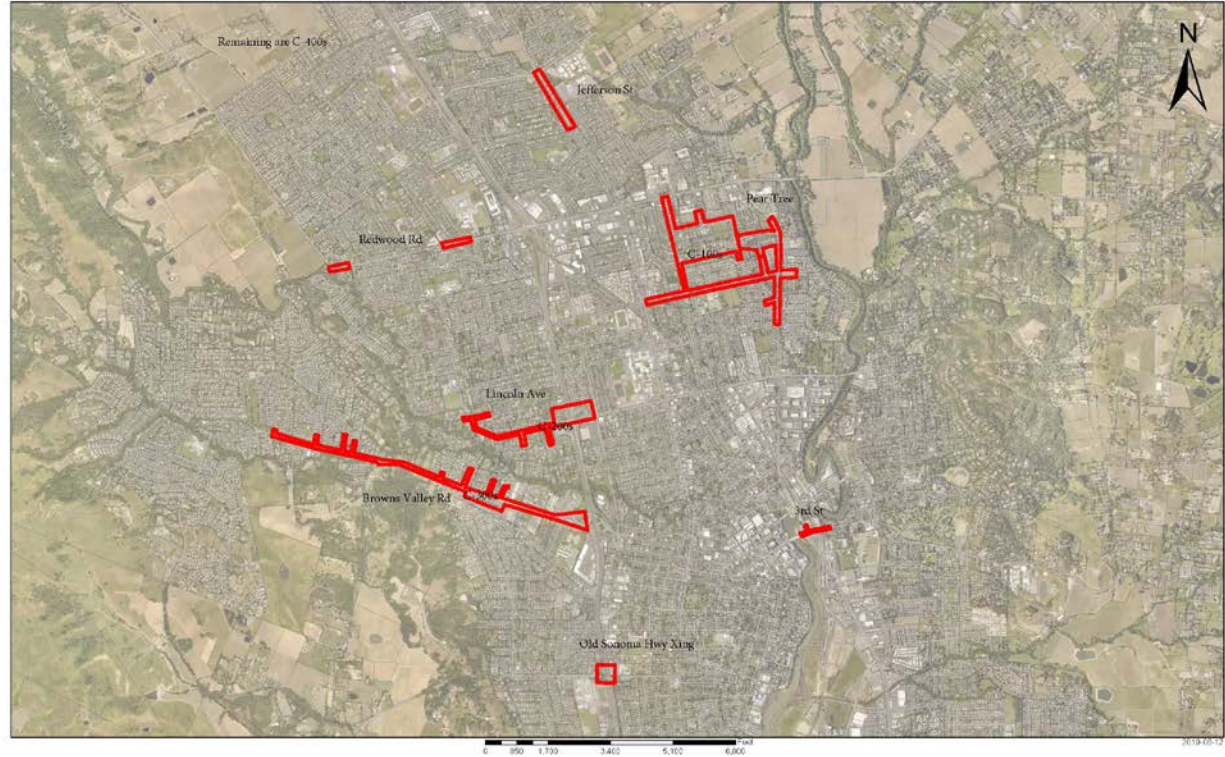
- Summer 2020 project
- Upper lateral pilot project #4
- Basin C manhole project (northwest Napa)
- Flow monitoring (winter 19/20)
- Pre- and post-construction flow monitoring
 - 19/20 monitoring
 - Post-construction Summer 2019 project
 - Pre-construction Future projects

2019 Project Area



2020 Project Map

NapaSan - 2020 I/I Rehab Project Areas





Next Steps

1. Continue I/I projects
2. Focus on infiltration and inflow
3. Focus on projects upstream of SSO
4. Continue flow monitoring
5. Continue evaluation of results
6. Collection System Master Plan
 - Expected completion December 2019

Questions

