South Haven Sewer System Improvements

January 27, 2016

Presentation Topics

- Sewer System Study Background and Components of the Study/Data Collection
- Recommended System Improvements
- Project Costs
  - Sources, Uses, and Potential Rate Impacts

Sewer System Study Background and Components

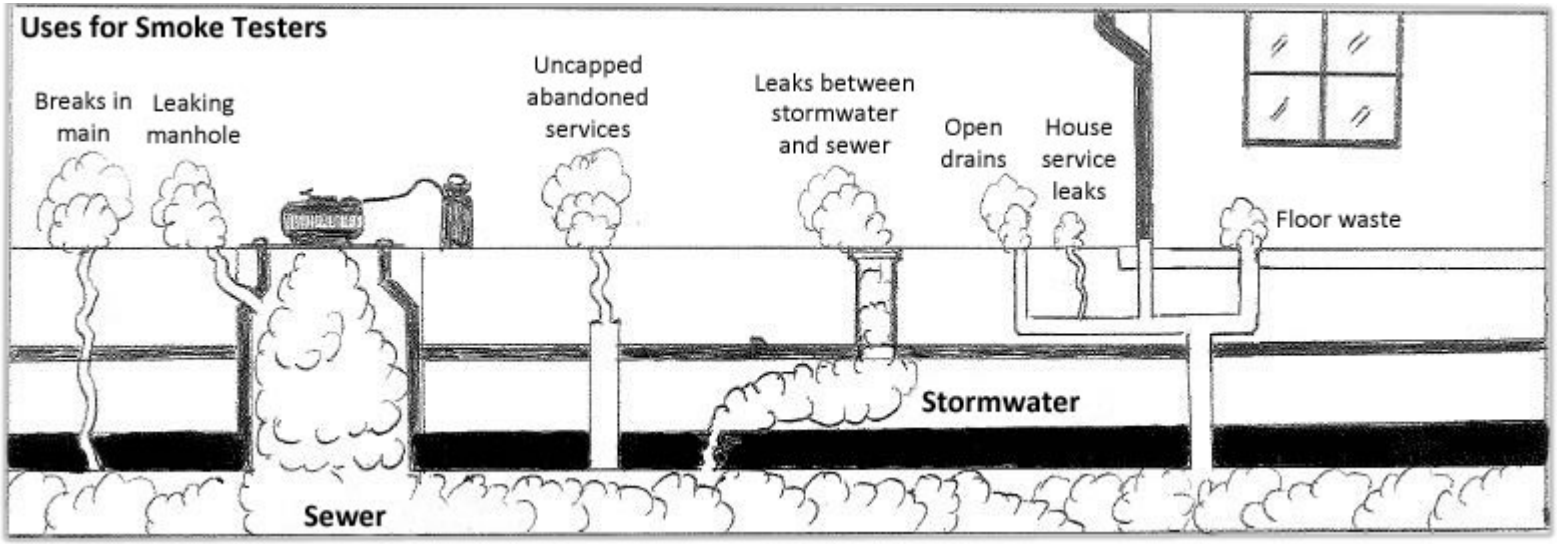
S2 Project Background

- Project Purpose
  - DEQ's S2 Grant Program intended to accelerate the progress of water pollution control efforts and facilitate system improvements through utilization of the State Revolving Fund Loan Program
- Project Scope
  - Identify opportunities to reduce or eliminate excessive wet weather Inflow and Infiltration (I/I) from the wastewater collection system
  - Identify "Critical Priority" structural defects warranting corrective action
  - Develop an **SRF Project Plan** to address these issues.

SRF Project Plan Data Collection Components

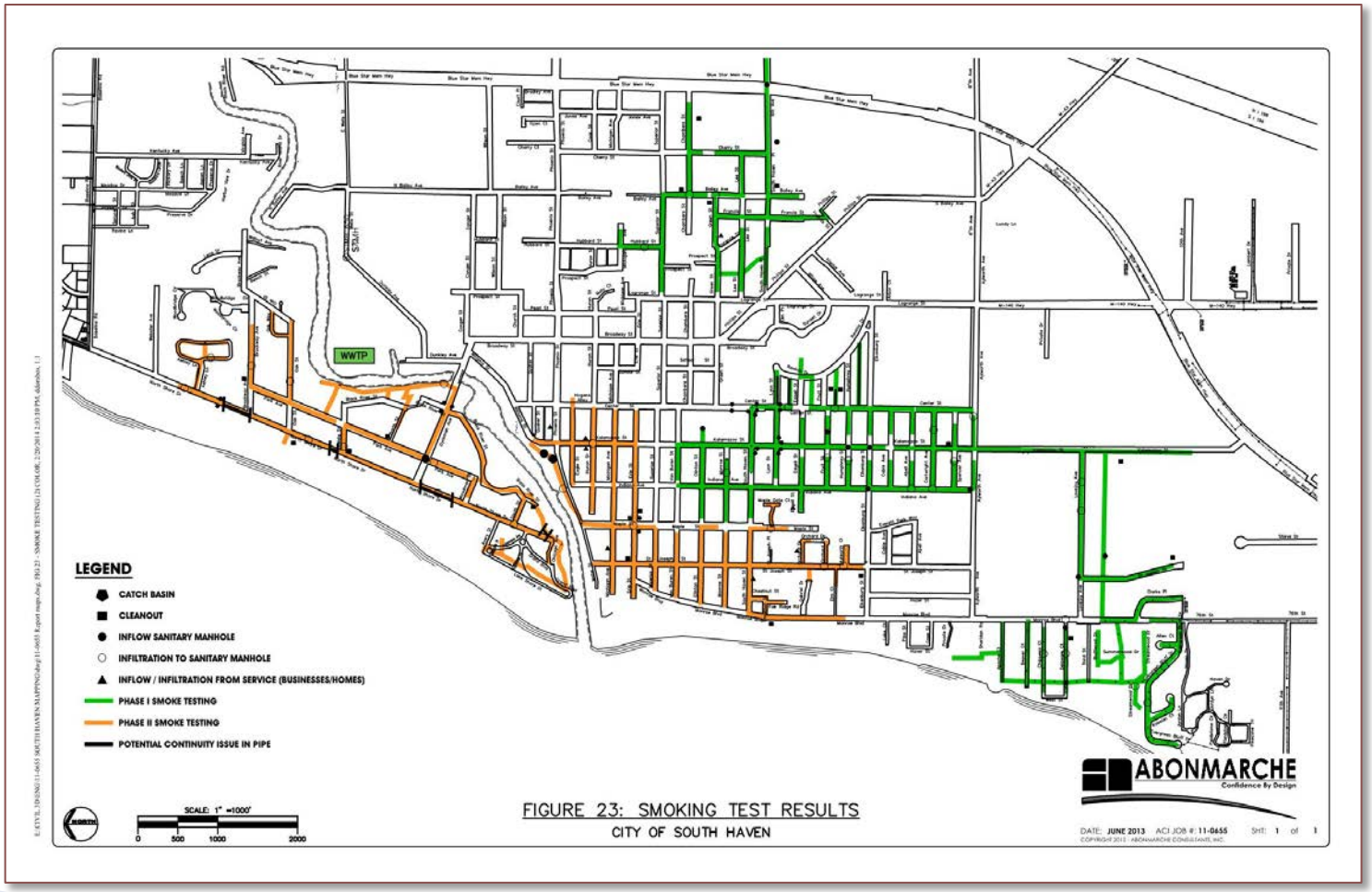
- Sewer System Mapping
- Smoke Testing
- Flow Metering and Computer Modeling
- Sewer Televising

Smoke Testing



Smoke Testing

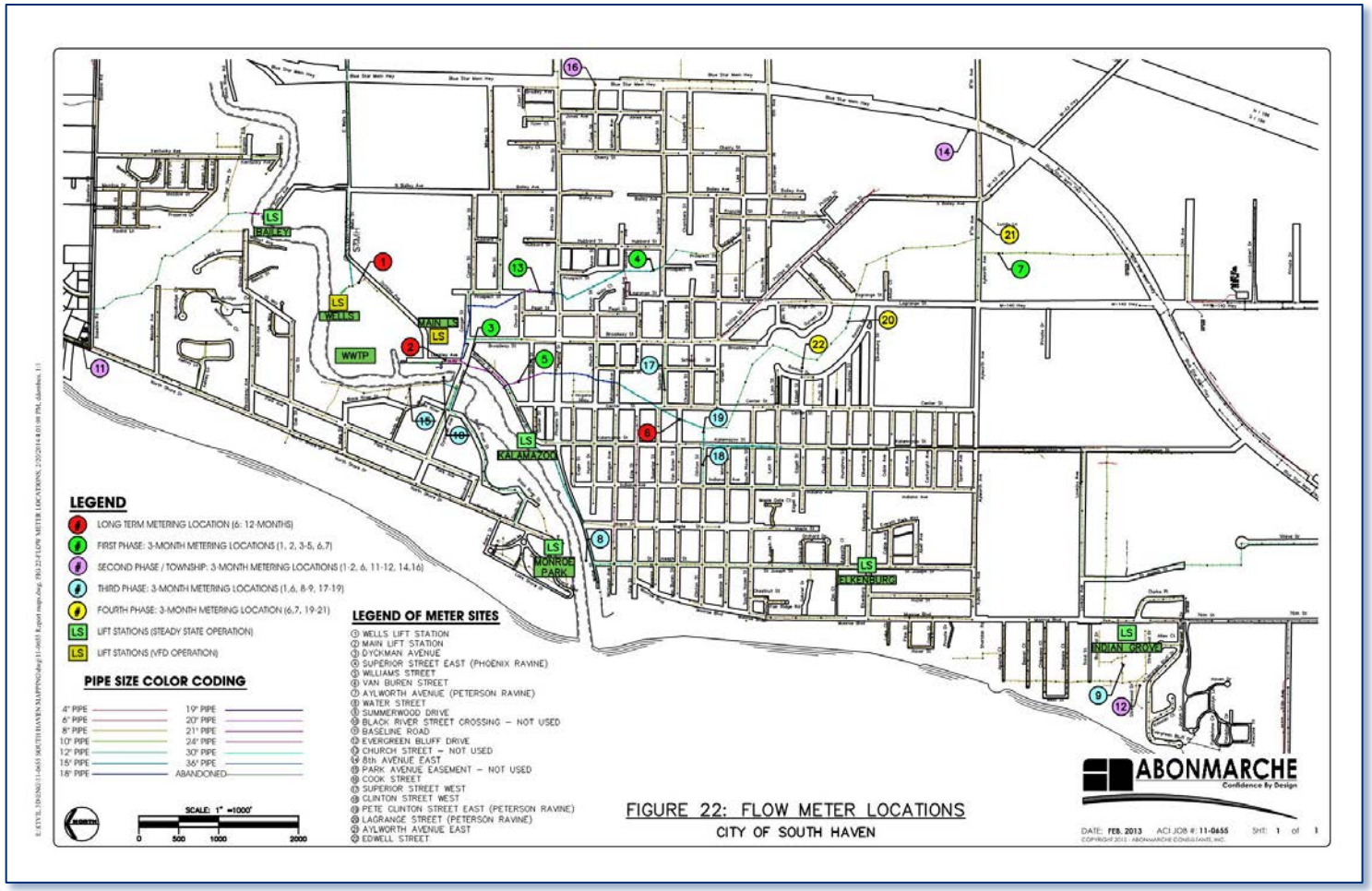
Areas Smoke Tested



Flow Metering

- Isolate and Quantify Flows
  - Program began in Spring 2012 and ran through Fall 2013 (3 months for Township inputs)
  - Dry Weather vs. Wet Weather Flows
    - Peaking Factor: Wet Weather Flow/Dry Weather Flow
    - High Peaking Factor: indicates defects and/or illicit flows
  - Assess System Capacity
  - Basis for Predictive Modeling 25-Year/24-Hour Storm
  - Continued to Monitor Flows Throughout the Study
- Help to Locate Possible Defects
  - Target Areas for Further Inspection

Flow Metering Map



Peak Wet Weather Flows

- The highest peaking factors were noted at:
  - Peterson Ravine (sites 6,18-21) – out to bid
  - Dyckman Avenue (site 3) – fixed by city with bridge
  - Main Lift Station (site 2) – total flow from all to WWTP
  - Wells Lift Station (site 1) – total flow from all to WWTP
  - Aylworth Avenue (site 7) – SH Township
  - Edgell Street (site 22) – poor condition sewers

  - Peak Flow days from the Authority over the past three years have exceeded the allowable amount on at least three occasions – October & November 2013 and January 2014.

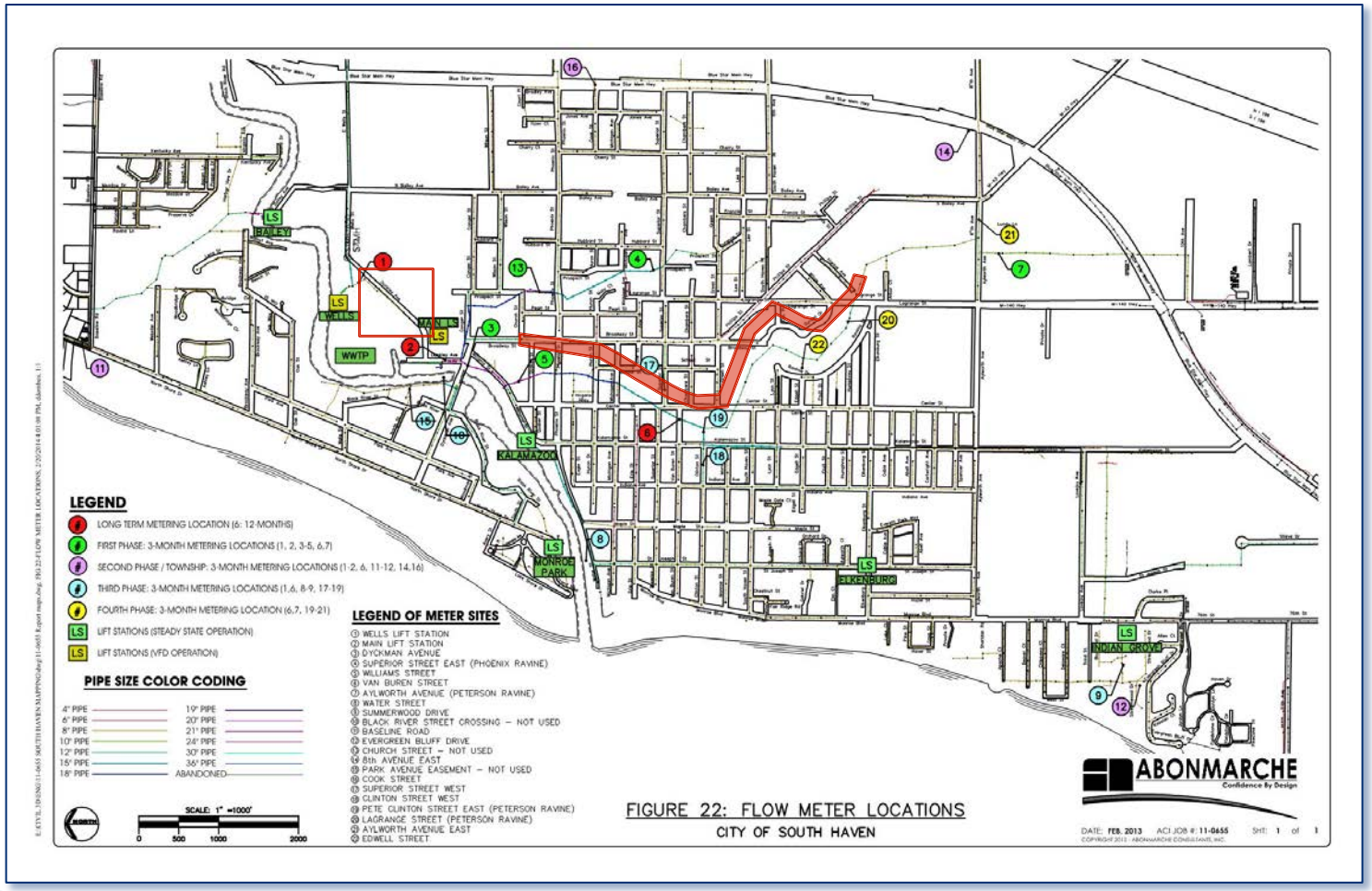
Authority Flows vs. Capacity

- Average Daily Flow in the Winter Months (per Agreement) is allowed up to the Purchased Capacity of 0.45mgd. A calculation using metered water consumption and REUs is used to measure capacity usage. This method of measurement is subject to interpretation and data not readily available through the billing system but LS and WWTP flow measurements are available on a daily basis. No winter months have exceeded purchased capacity.
- Peak Month can be 1.5 times the Average Daily Flow per Agreement.
- Peak Day can be 2 times the Average Daily Flow. At least three days corresponding to wet weather pushed beyond this limit.

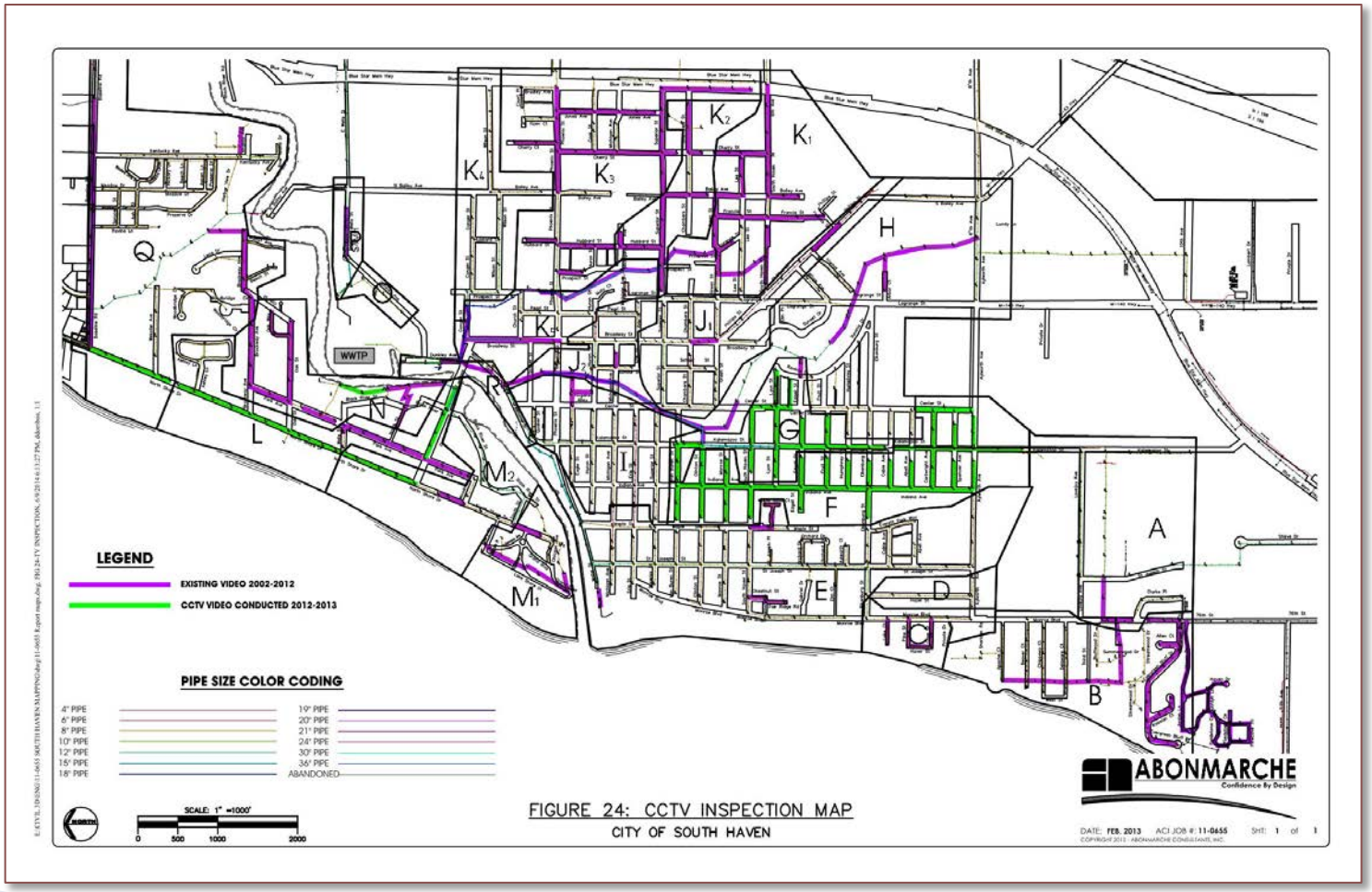
Total Flows to WWTP

- The Average Daily Flow to the WWTP in 2015 was 1.23mgd. Plant Capacity is 2.13mgd.
- The Largest Flow Month was June at 1.63mgd
- The highest precipitation was noted in May/ June
- Peak flow days exceeded Plant Capacity on rainy days between April and July

System Modeling – Capacity Issues



Sewer Televising Map



CCTV Results

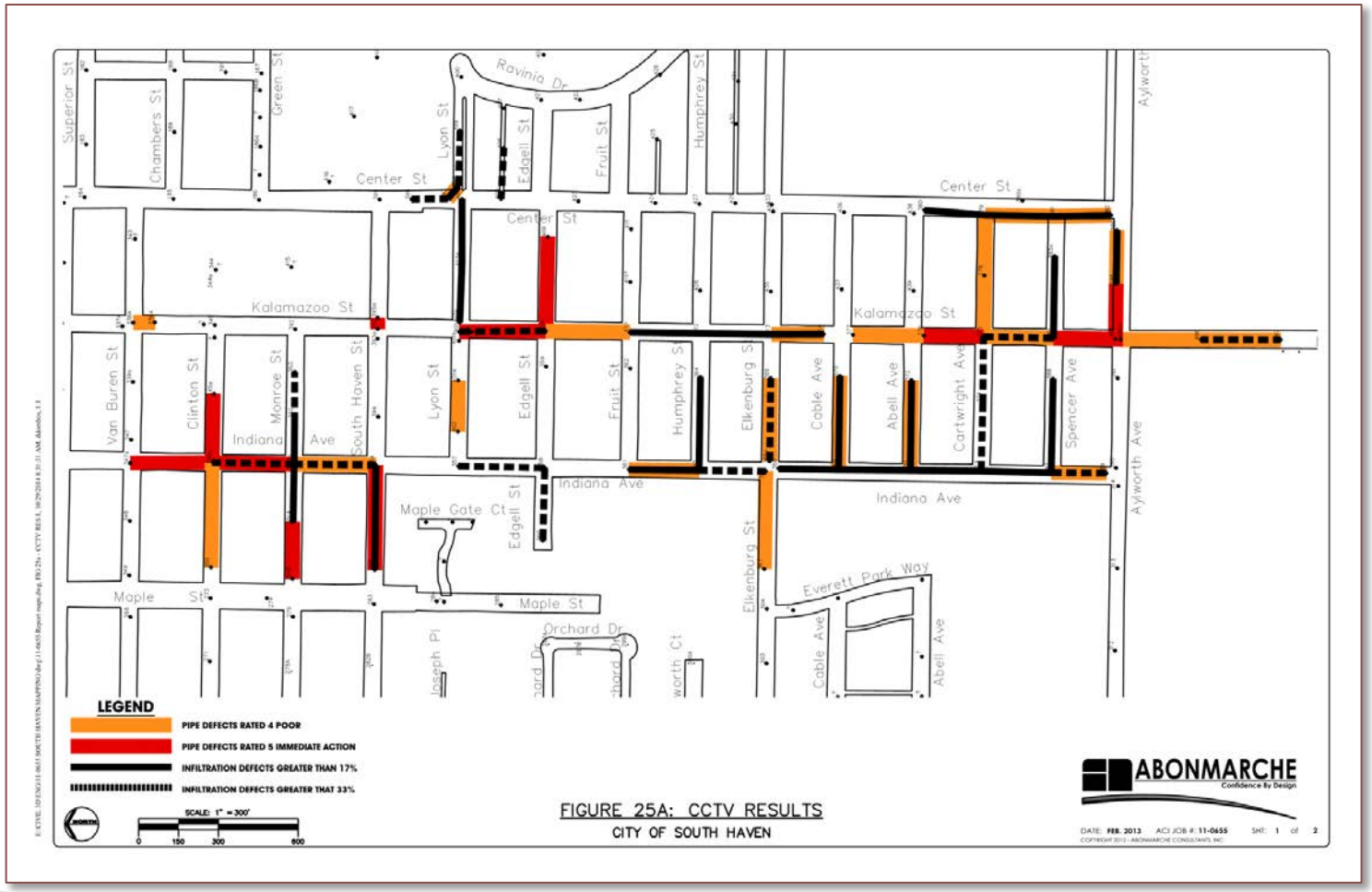


FIGURE 25A: CCTV RESULTS
CITY OF SOUTH HAVEN

2010 Wastewater Treatment Plant Evaluation

WWTP Evaluation – Summary

- The treatment process meets the permit under normal conditions but components and lift stations are wearing out
- Improvements can help reduce operating costs

WWTP Evaluation – Summary

- Capacity of the WWTP is 2.19mgd, average flow to the WWTP is 1.23-1.35mgd. Wet weather flows stress the capacity of the WWTP and Main LS, which has seen numerous overflows
- Wet weather flows impact plant operations and sizing of equipment – “the effects of the peak summer population in the City are less impacting than the wet weather flows”

WWTP Evaluation – Summary

- The WWTP was originally constructed in 1933
- Major renovations were constructed in 1963, 1971, and 1988, along with minor improvements every few years as needed
- Most of the facilities are 50+ years old
- The service area that was studied included the city; Casco Twp. bounded by 107th, I-196, Baseline, and Lake Michigan; SH Twp. bounded by Baseline, 70th, 20th, and City

WWTP Evaluation – I

- Influent and Primary Treatment required to address imminent operational and/or capacity issues
  - Main (80% of flow – city/south) & Wells (20% of flow – north city and Casco) Lift Stations (45-80 yrs old)/Headworks Building
    - Capacity, Structural, and Equipment Issues
  - Raw Wastewater Screening & Grit Removal(50 years old)
    - Damaged and Ineffective
    - Operational Issues result from debris getting through
  - Influent Metering
    - Inaccurate at High Flows

WWTP Evaluation – II

- Secondary Treatment to address permit compliance, operational/process efficiency savings in the 5-10 year range
  - Biological Treatment (50 years old)
    - Capacity, Aeration, and Pumping Issues – 45% of the electrical usage
  - Settling Tanks (30-50 years old)
    - Inadequate Capacity for proper sludge thickening
  - Chemical Feed (40-50+ years old)
    - Replace Equipment & Remove Retired Equipment for added safety and efficiency
  - Solids Handling (30-50 years old)
    - Inadequate Capacity and Storage
    - Non-compliant with 10 State Standards – private hauler to assist

WWTP Evaluation – III

- Tertiary Treatment to address potential growth and permit issues in the 10-15 year range
- Facilities
  - Electrical
    - Replace Motor Control Center (MCC) – original still in place
    - SCADA System Replacement – limited capacity and interface
  - Structural and Building Needs
    - Laboratory – Climate Control, Roof, and Offices
    - Maintenance Building – Equipment Storage

Recommended System Improvements

Recommended Improvements

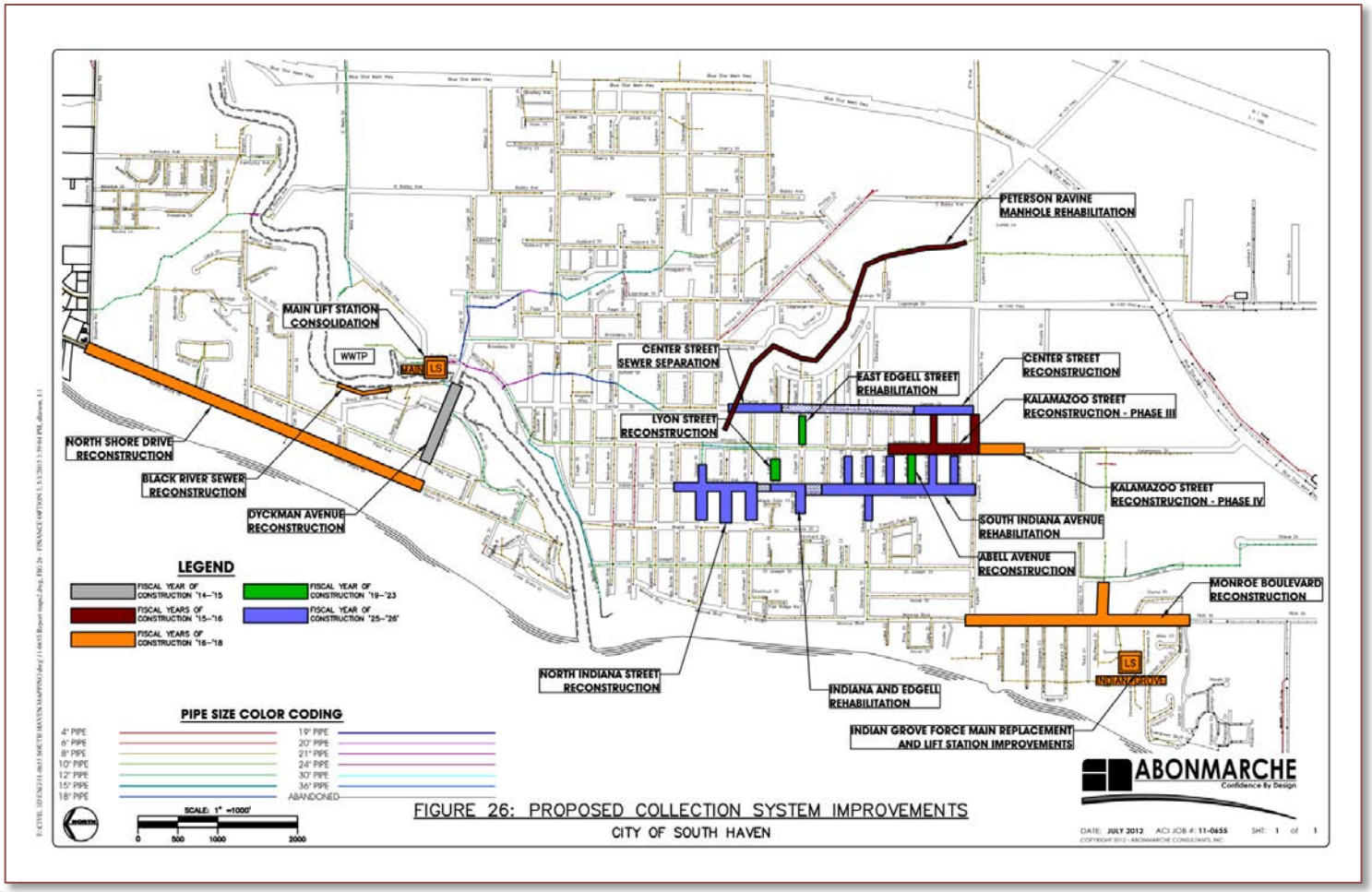
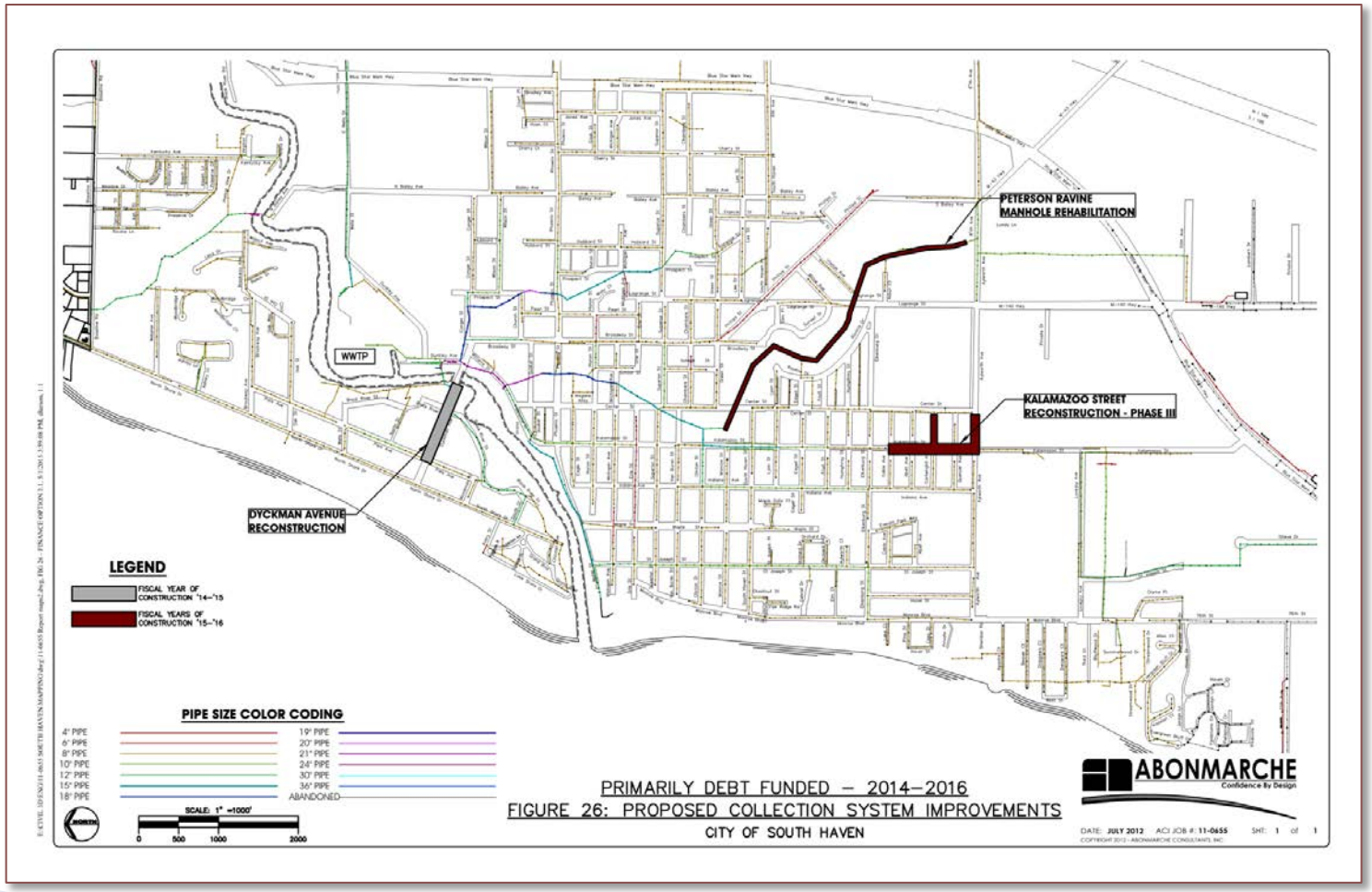
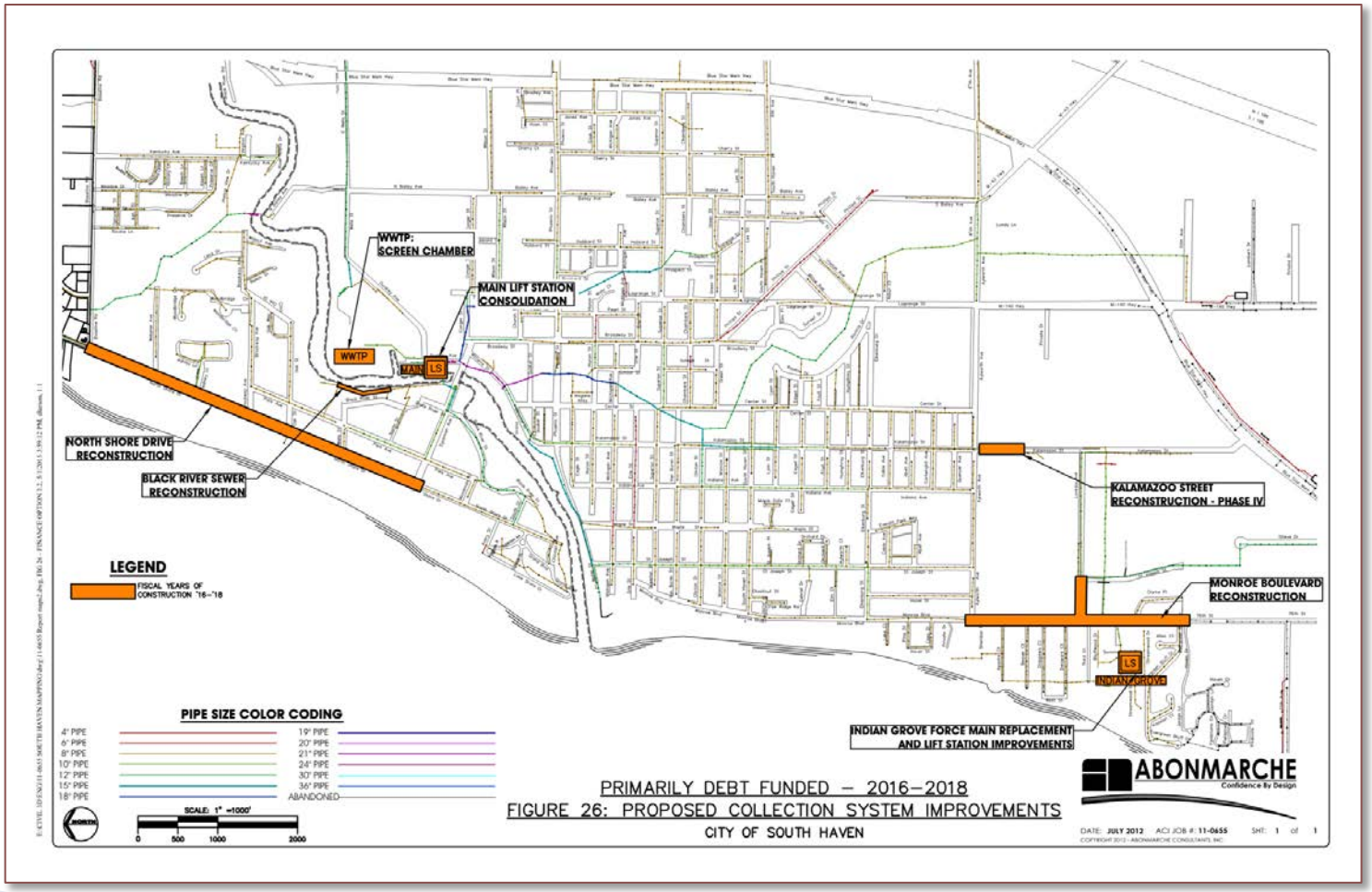


FIGURE 26: PROPOSED COLLECTION SYSTEM IMPROVEMENTS
CITY OF SOUTH HAVEN

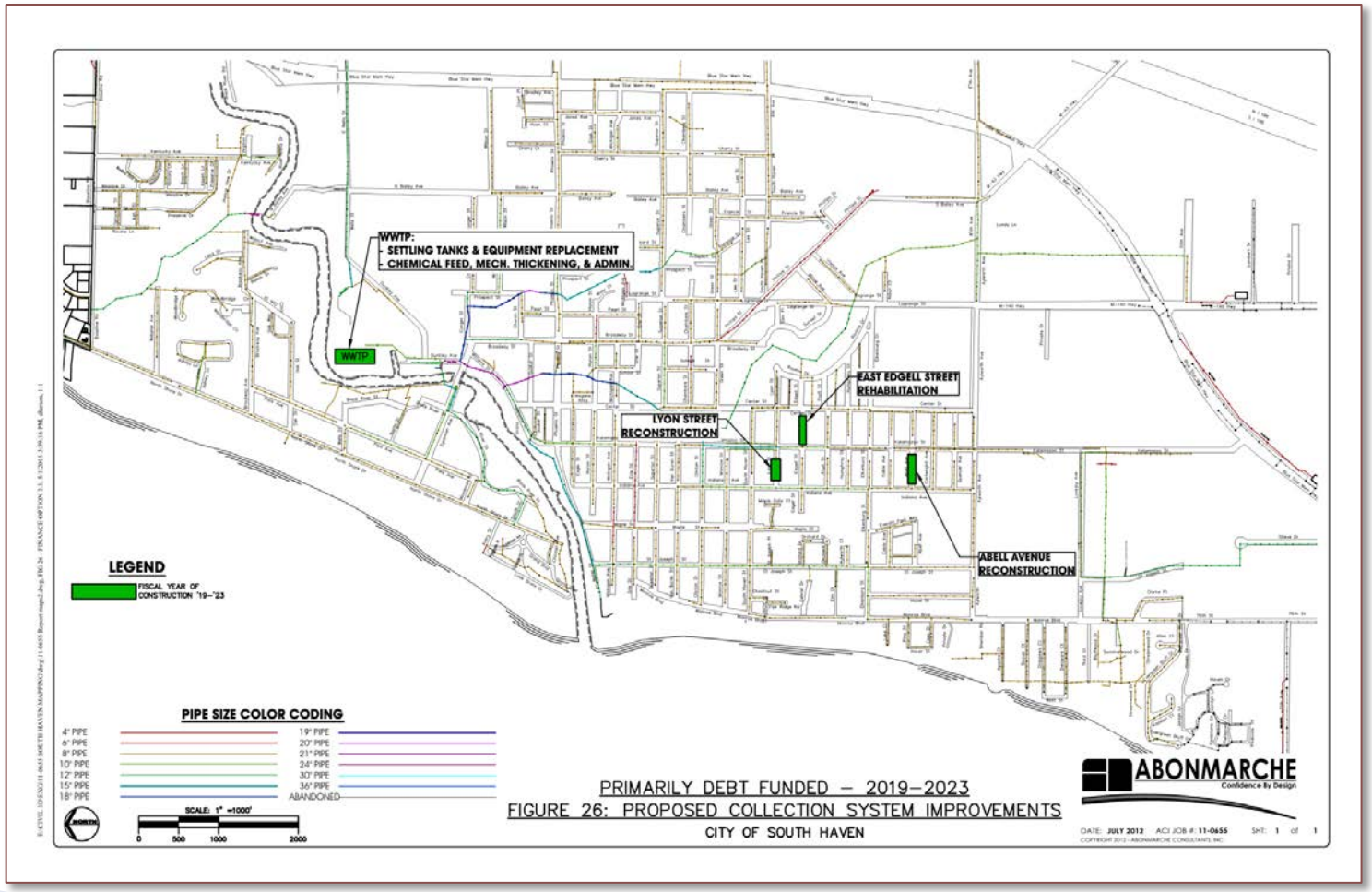
Phase 1 Projects



Phase 2 Projects



Phase 3 Projects

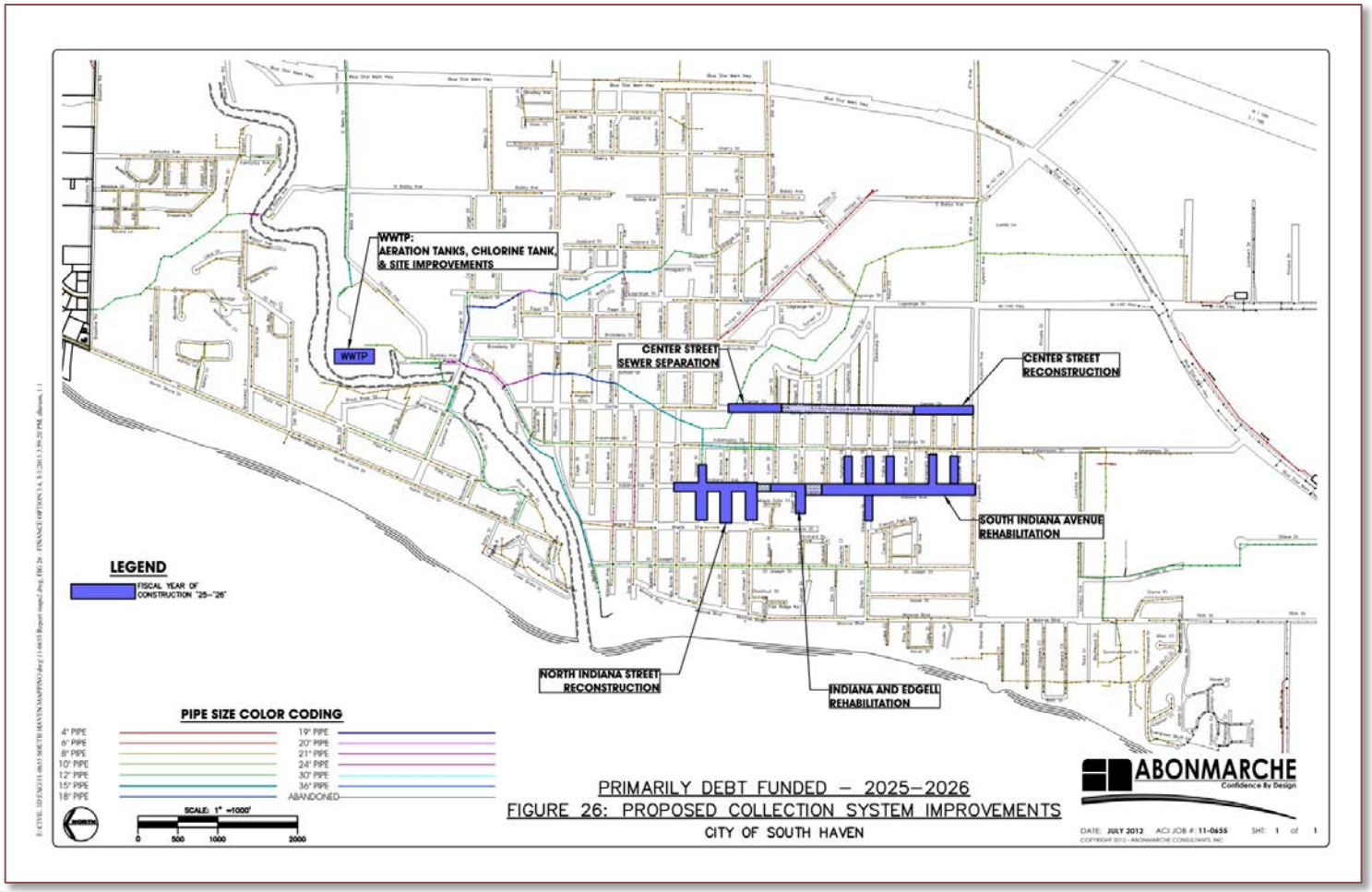


PRIMARILY DEBT FUNDED – 2019–2023

FIGURE 26: PROPOSED COLLECTION SYSTEM IMPROVEMENTS

CITY OF SOUTH HAVEN

Phase 4 Projects



Sources, Uses and Potential Rate Impacts

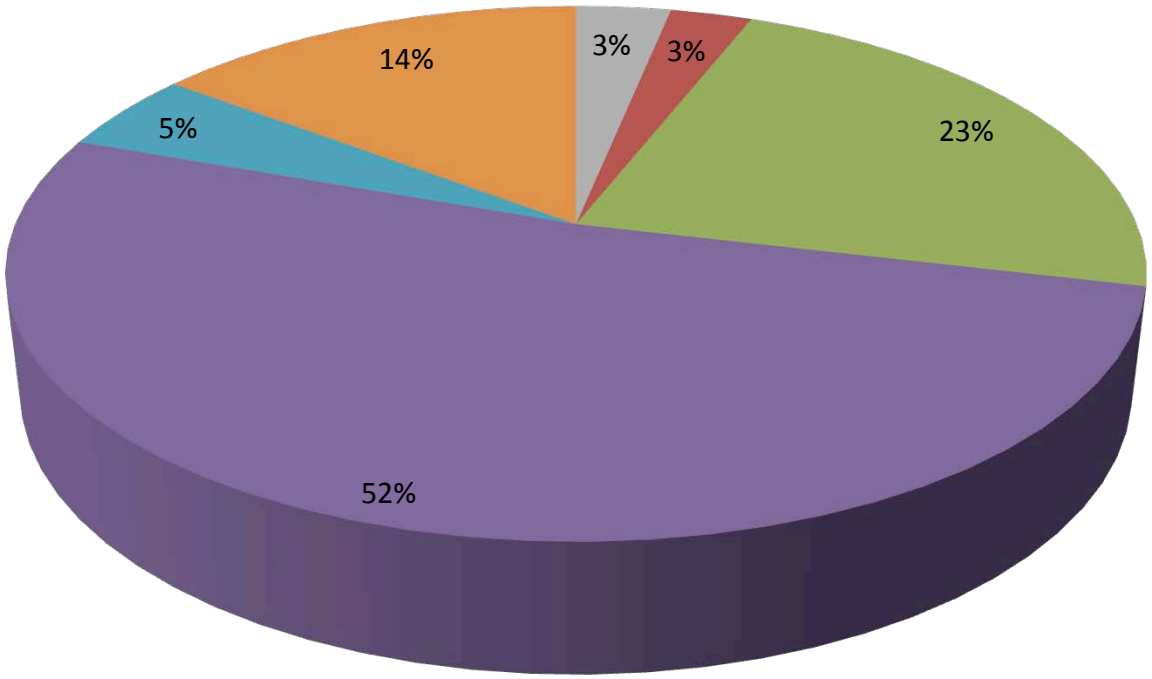
Issues to Address Together

- Of the projects identified above, the following address flows from both City and Township users
- Peterson Ravine
- Kalamazoo Street
- Indian Grove Lift Station
- Main/Wells Lift Stations
- WWTP

Project Plan: Uses of Funding

Completed Projects (Dyckman)	$995,028
2015/2016 Projects (Peterson Ravine/Kalamazoo St – Joint)	$856,769
Remaining Sewer	$7,031,922
WWTP (including Lift Stations – Joint)	$16,031,567
Water	$1,492,385
Road, Storm & Misc.	$ 4,551,636
Total Project Cost	$30,959,307

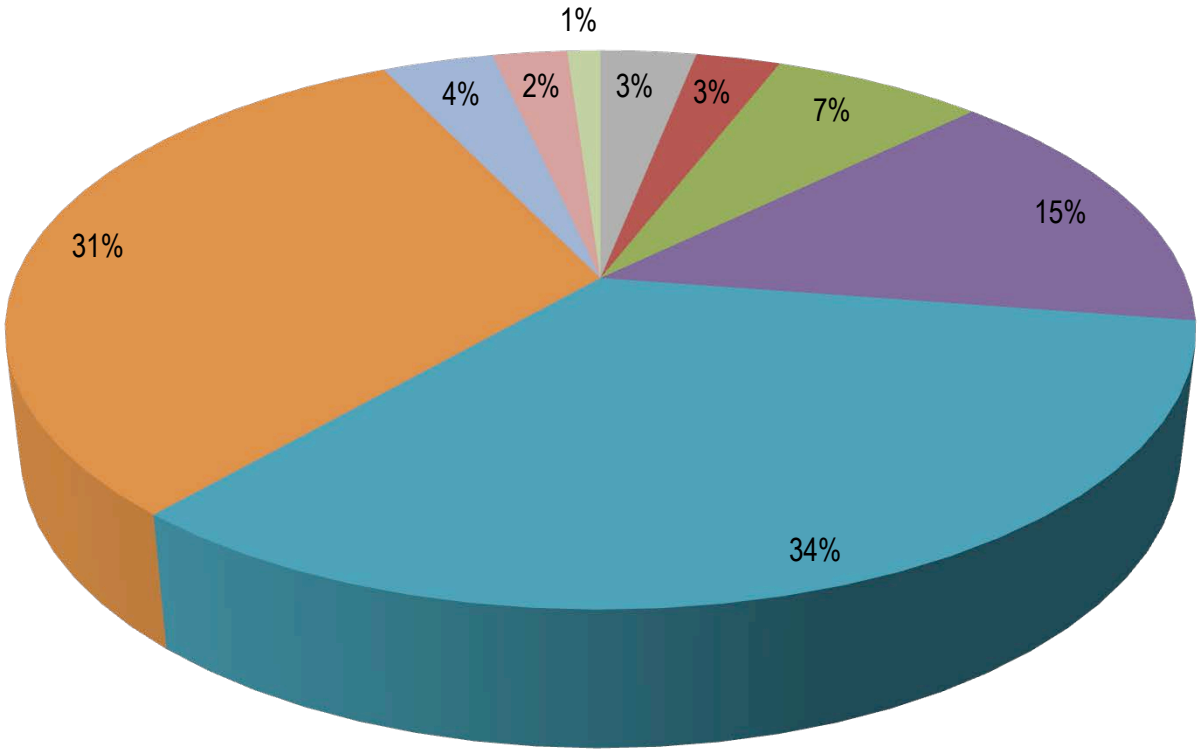
Project Plan: Uses



Project Plan: Sources

Completed Projects (Dyckman) – City Funds	$962,758
2015-2016 Projects (Peterson Ravine/Kalamazoo St)	$856,769
Special Assessment: 25% of Sewer & Water	$2,131,076
Road Funds:	$4,551,636
SRF: 75% of Sewer & Main LS Consolidation	$10,514,188
USDA: WWTP Improvements (All Rate Payers)	$9,743,000
Water Rates: 75% of Water (City Rate Payers)	$1,119,288
Local Sewer Rates: (City Rate Payers)	$327,860
SAW Grant	$ 752,732
Total Funding Sources:	$30,959,307

Project Plan: Sources



- Completed Projects
- 2015/2016 Projects
- Special Assessment: 25% of Sewer & Water
- Road Funds:
- SRF: 75% of Sewer & Main LS Consolidation
- USDA: WWTP Improvements (All Rate Payers)
- Water Rates: 75% of Water (City Rate Payers)
- SAW Grant
- Local Sewer Rates: (City Rate Payers)

Rate Impacts through Phase 2

SRF – Sewer	$2,593,356
SRF – WWTP & Lift Stations	$5,920,798
Water Funds	$385,558
Road Funds	$3,225,293
Special Assessments	$1,064,695
SAW Grant	$582,946
Total Cost	$13,772,646

City Users = $10.94/mo
Township Users = $6.19/mo

The rate impacts defined above are a conservative, rough average on a per user basis for the projects defined in the Project Plan. We have engaged a rate consultant to provide a more detailed analysis of potential rate adjustments based upon existing debt expiration dates, system growth, operation and maintenance costs, additional capital needs, additional funding sources, etc. Their preliminary review concurs with the rate impacts shown in our analysis.

Rate Impacts through Phase 2

For example, if LDFA/DDA are able to commit a combined $100,000/year for 20 years, the rate impacts would be lessened for all users to:

City Users = $9.30/mo

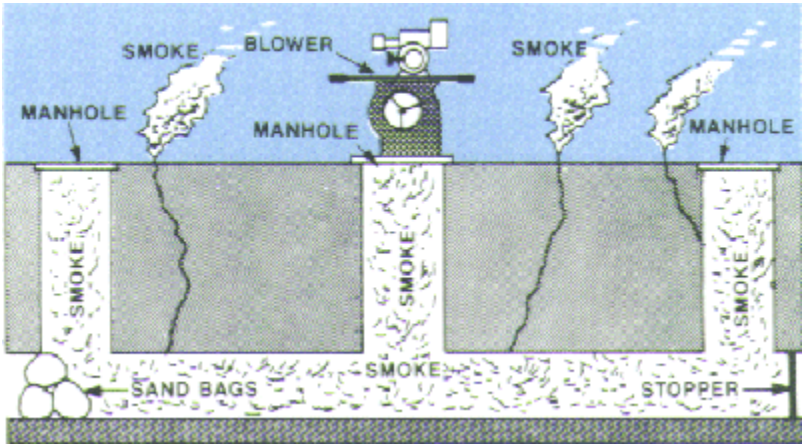
Township Users = $4.55/mo

Additionally, since the City was granted Disadvantaged Status the SRF loan term could be extended to 30 years and receive $500,000 in loan forgiveness, further reducing the impact on user costs to:

City Users = $6.00/mo

Township Users = $3.00/mo

Questions and Answers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BLOWER
SMOKE
MANHOLE
MANHOLE
MANHOLE
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SMOKE
SMOKE
SAND BAGS
STOPPER