



Montecito Sanitary District's Response to the Thomas Fire 1/9 Debris Flow Event



July 17, 2018

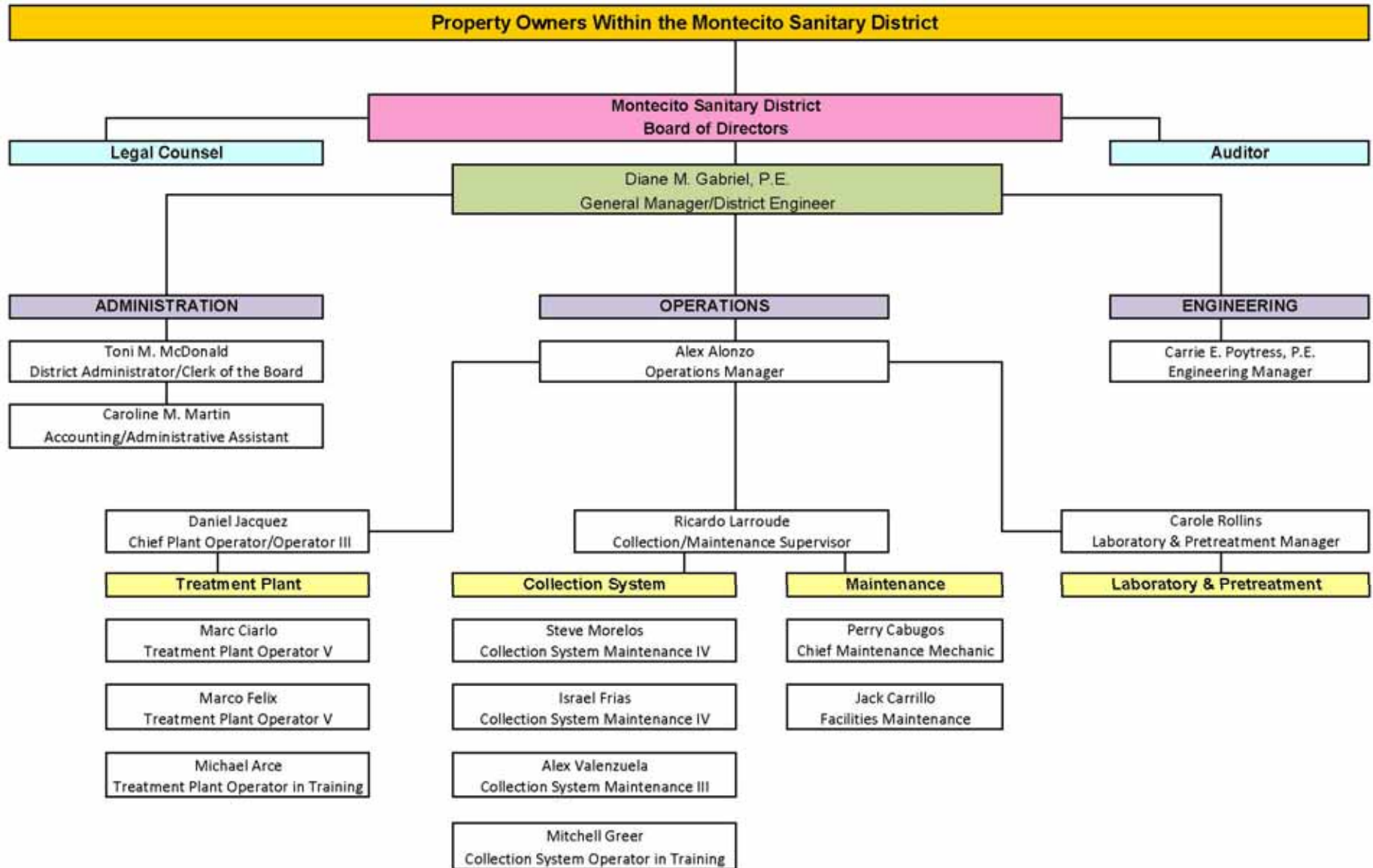


Outline of Presentation

- Background information on the District
- Overview of the Thomas Fire Debris Flow Event
- Impacts on the District's Collection System and Treatment Plant
- Preparedness Efforts for future Debris Flows
- Plans for continuing NPDES Permit Compliance



Organization Chart





Collection System

- Located in unincorporated area of Santa Barbara County
- 8.9 square mile service area
- District serves estimated population of 9,000 people
- District serves 3,109 properties
- 75 miles of sewer main
- Rehabilitated 26 miles of sewer main
- 2,034 manholes and cleanouts
- 4 sewer lift stations
- Zero District sanitary sewer overflows (SSO) from Dec. 2015 to Jan. 9, 2018

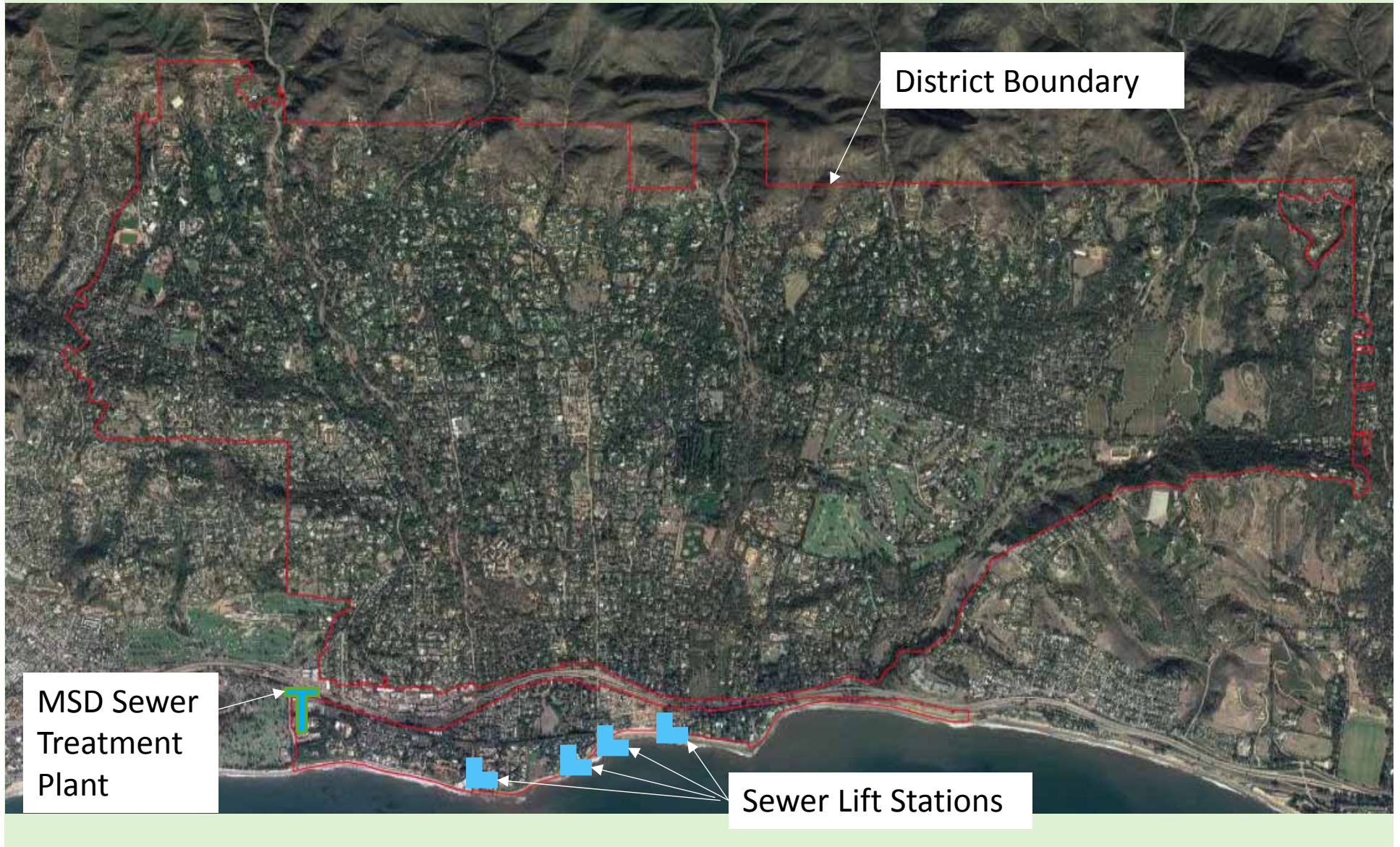


Treatment Plant

- NPDES Permit No. CA0047899, Order No. R3-2012-0016, Administrative Extension Issued February 7, 2018;
- 1.5 MGD permitted capacity
- Full secondary treatment
- 550,000 gpd Average Daily Flow prior to Thomas Fire
- 450,000 gpd currently
- Ocean outfall 1,500 feet long in 35 feet of water to the Pacific Ocean

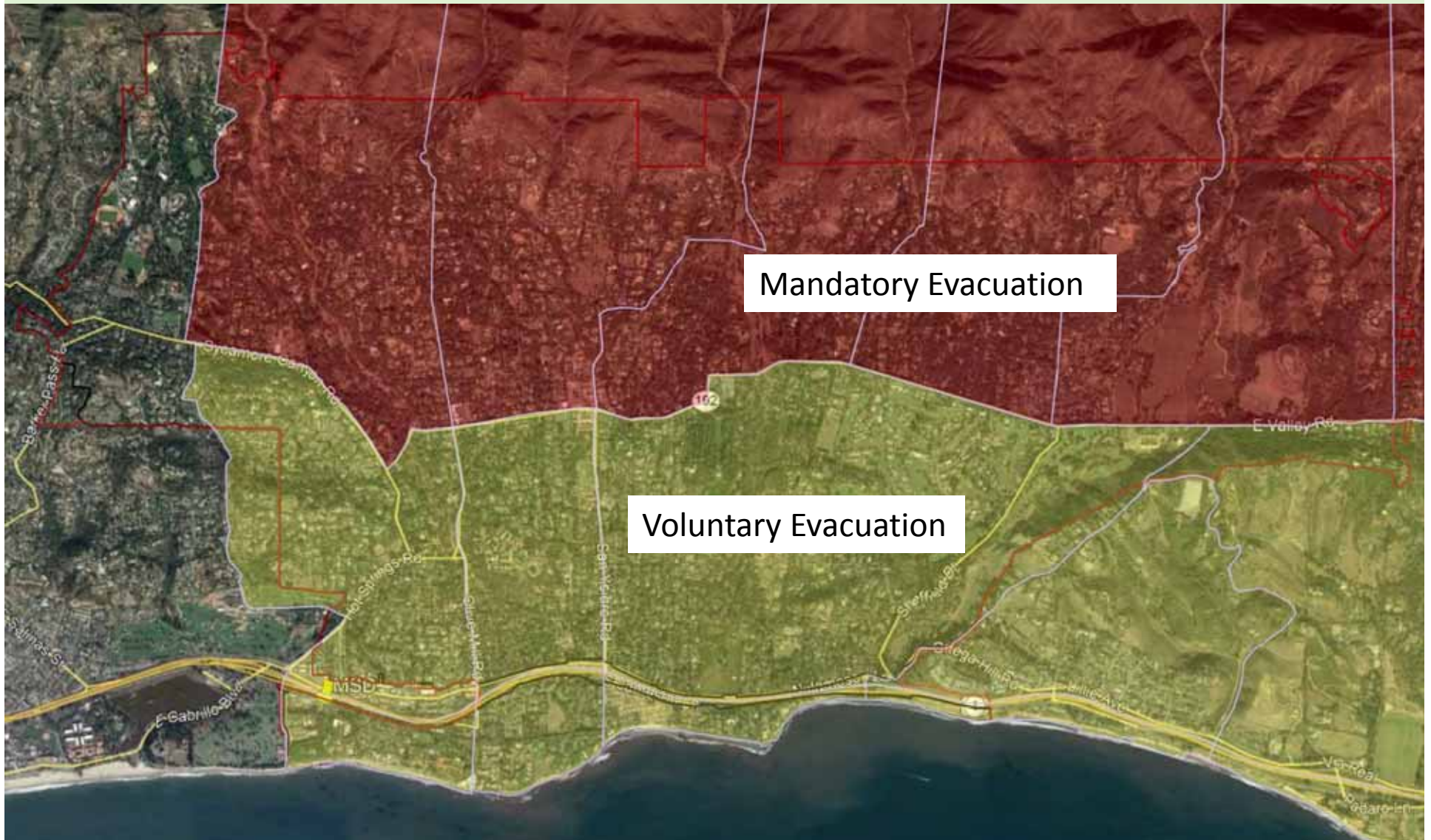


District Service Area





Jan 8th Evacuation Order

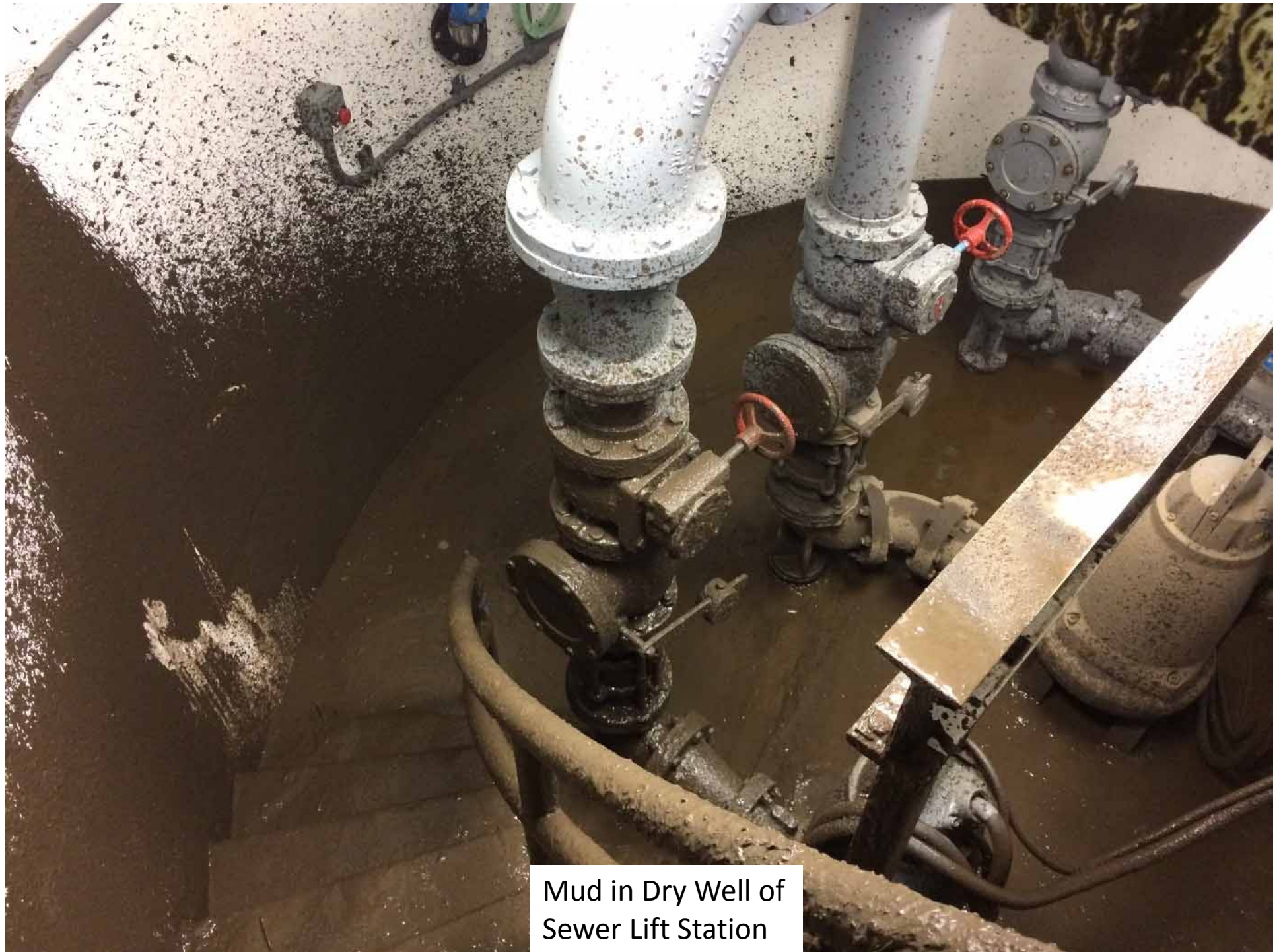




View of Highway 101 looking west
from Olive Mill Road overpass



Mud in Electrical Room
of Sewer Lift Station



Mud in Dry Well of
Sewer Lift Station



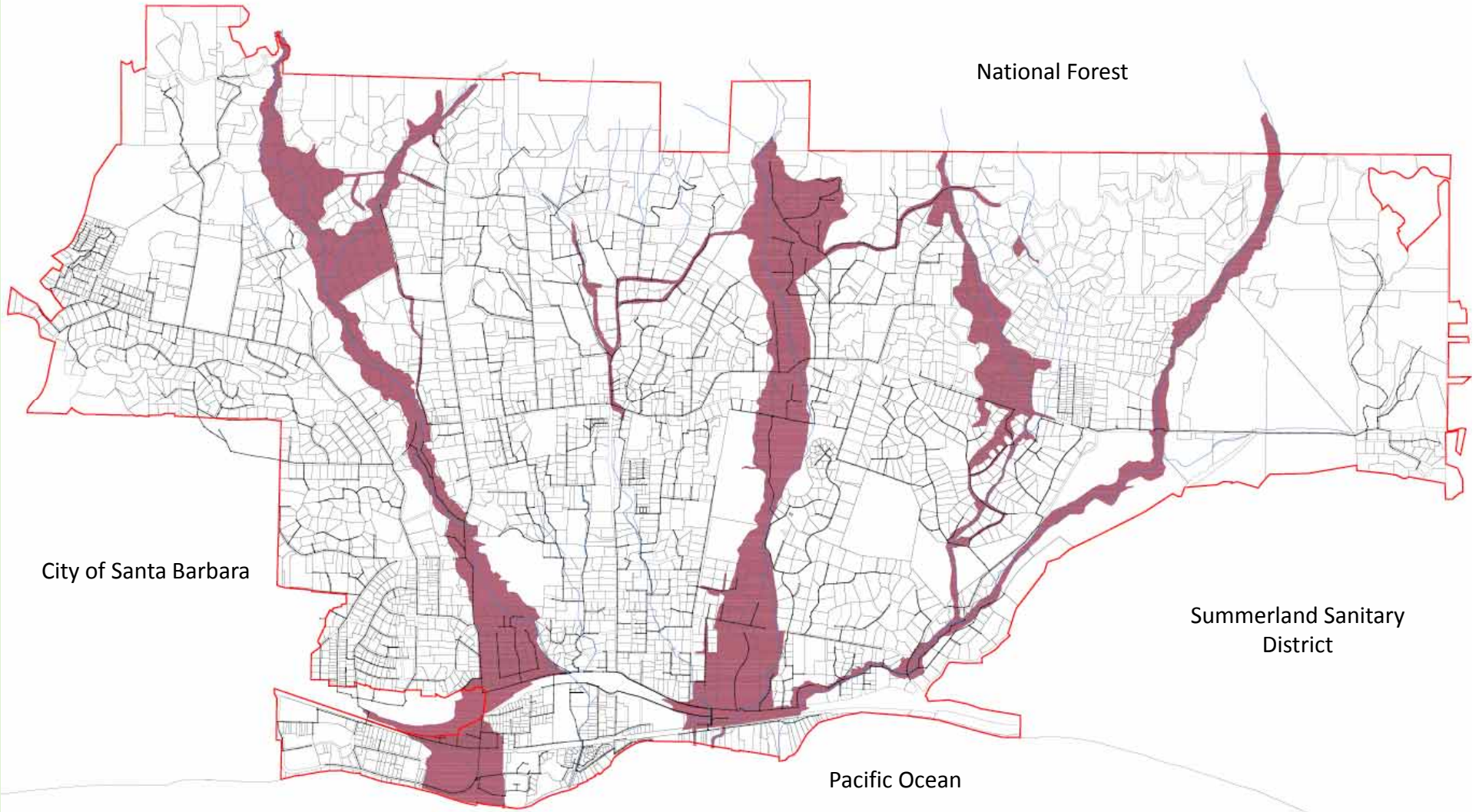
Debris and Hazards at
Hot Springs Road



Mud and Debris in Sewer Easement south of Glen Oaks Neighborhood



1/9 Debris Flow Event





Morning meeting with MSD Operations Staff and Inspectors to discuss locations for days work

Once sewer manholes were located, Blois Construction (hired by MSD) cleared debris so manholes could be assessed for damage or debris in pipelines





Blois Construction (hired by MSD) cleared debris so access to manholes within our easement could be assessed for damage or debris in pipelines



Blois Construction (hired by MSD) cleared debris and marked the sewer manholes in green so manholes could be assessed for damage or debris in pipelines



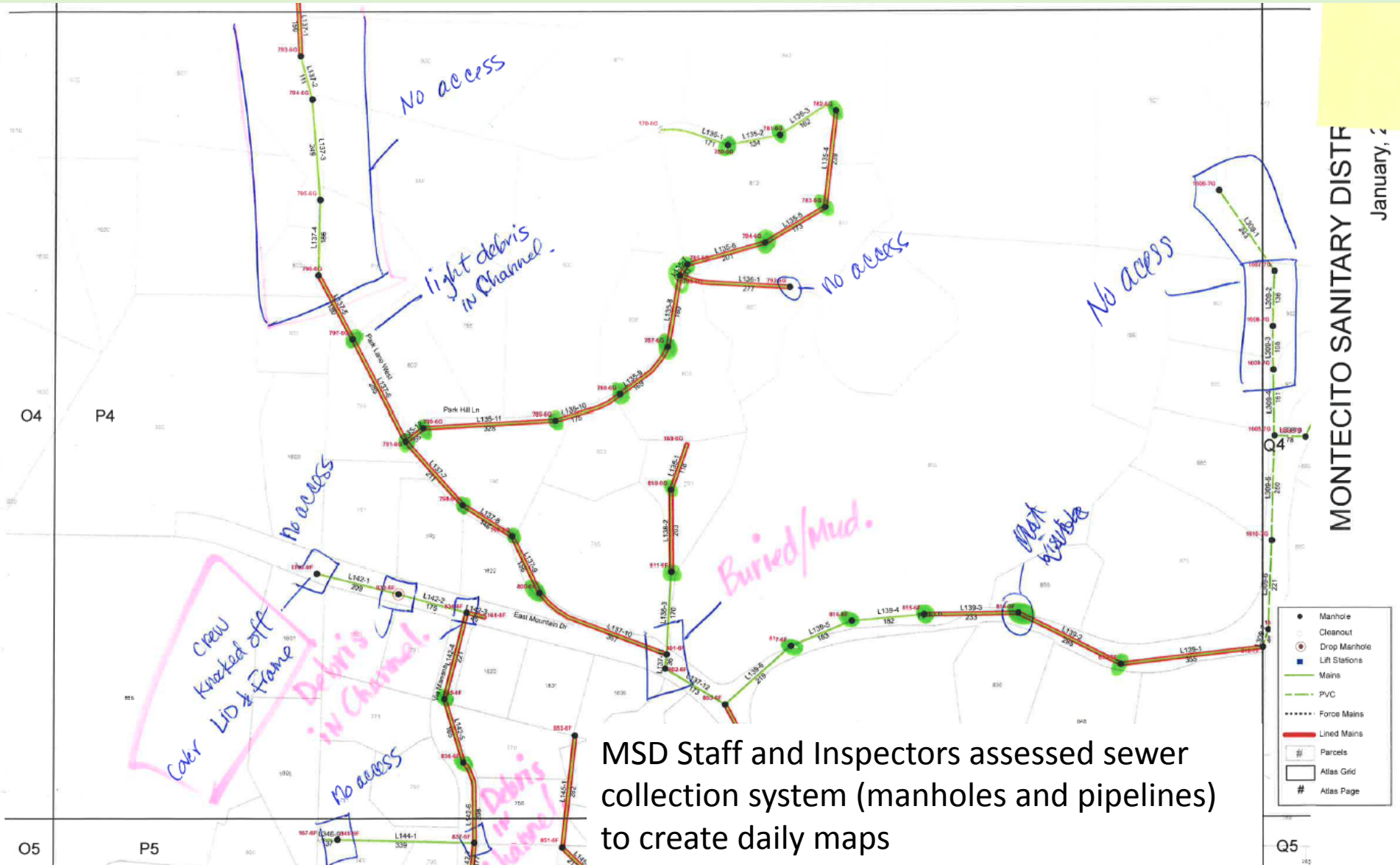
Sewer manhole marked in green so manholes could be assessed for damage or debris in pipelines

MSD Staff and Inspectors opened over 1,900 sewer manholes to see if manhole was damaged or if debris is in the pipeline below





Condition Assessment

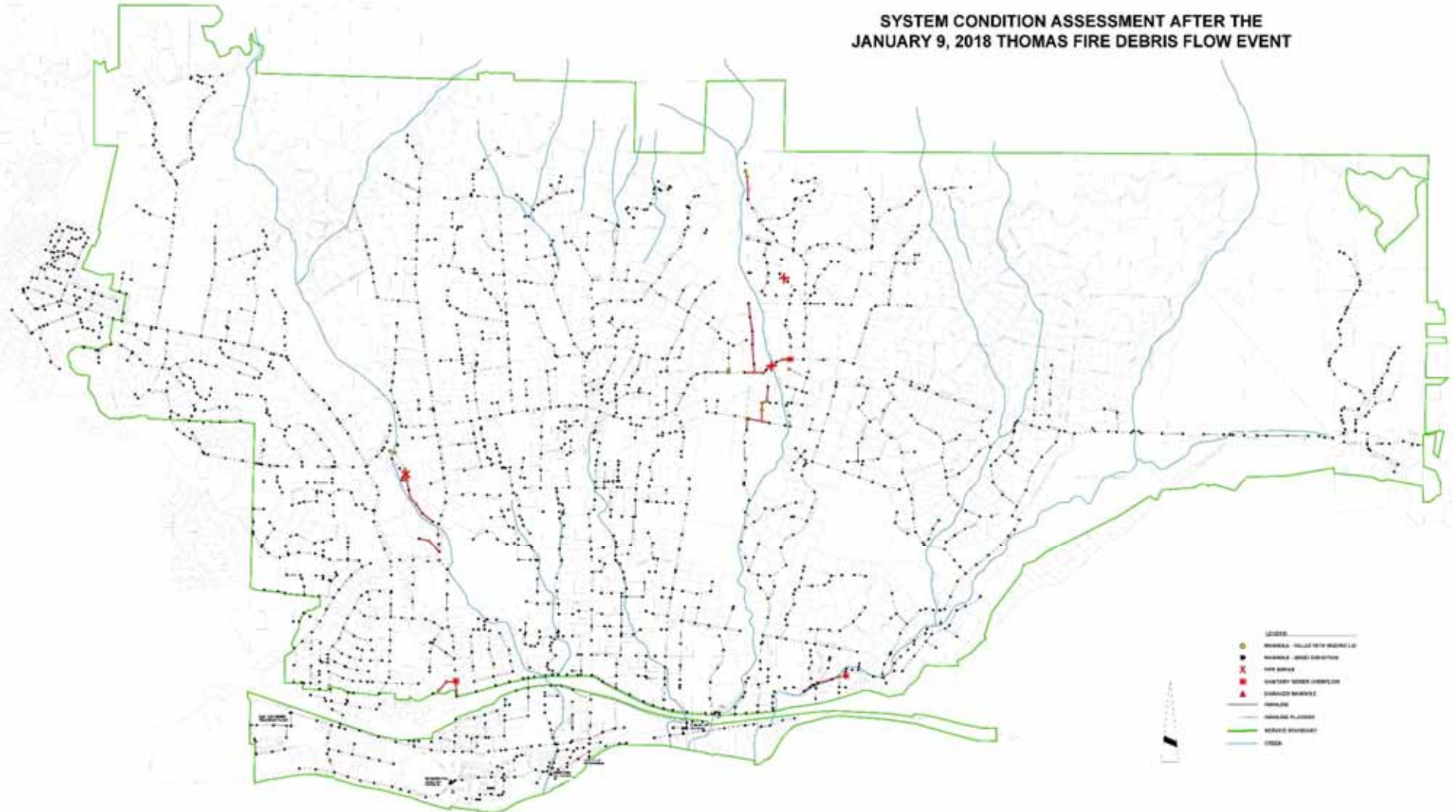


MSD Staff and Inspectors assessed sewer collection system (manholes and pipelines) to create daily maps



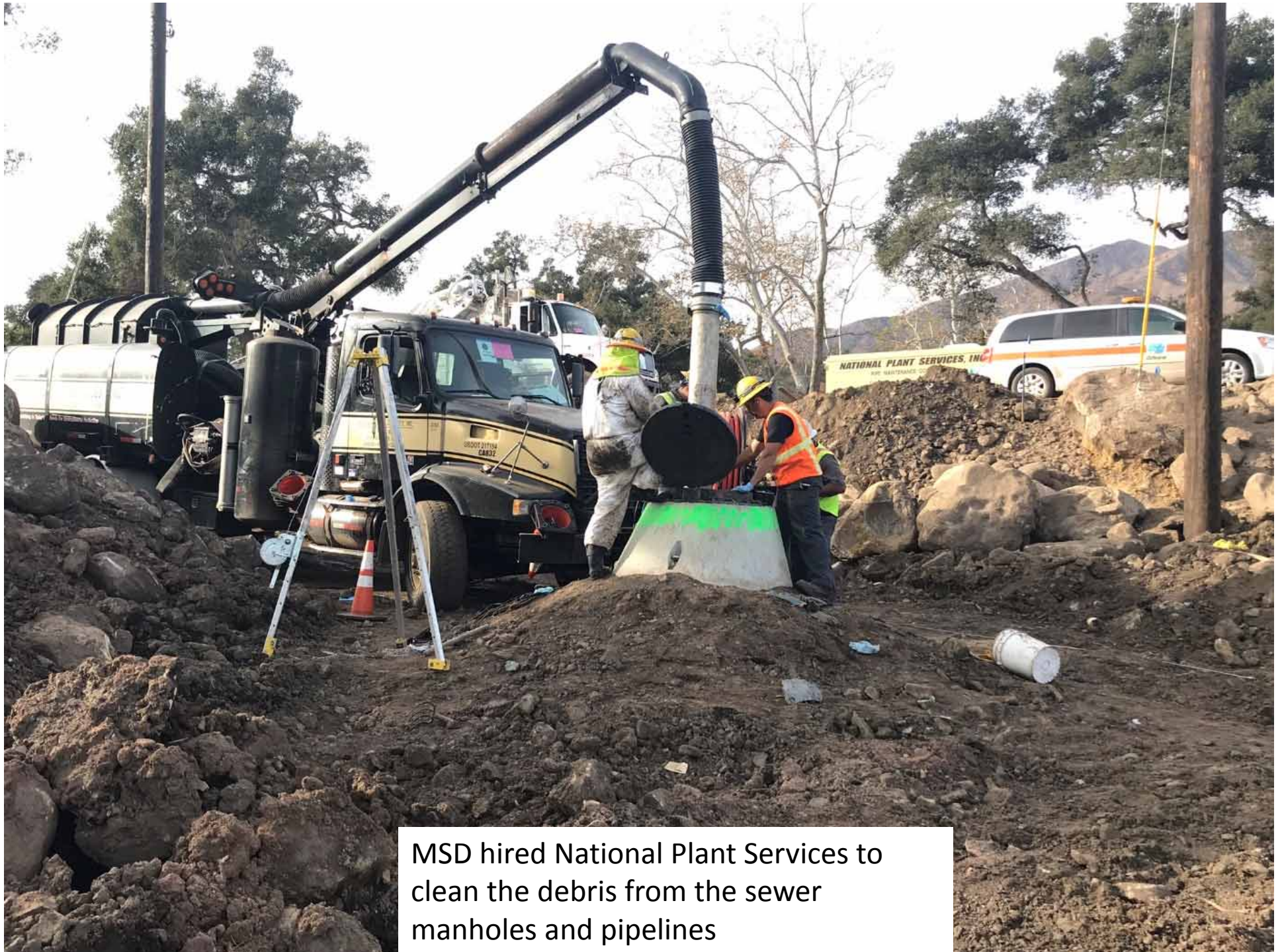
Condition Assessment

SYSTEM CONDITION ASSESSMENT AFTER THE
JANUARY 9, 2018 THOMAS FIRE DEBRIS FLOW EVENT



MSD hired National Plant Services to clean the debris from the sewer manholes and pipelines based on the condition assessment mapping





MSD hired National Plant Services to clean the debris from the sewer manholes and pipelines

MSD hired National Plant Services to clean the debris from the sewer manholes and pipelines- this is an example of the debris that was removed

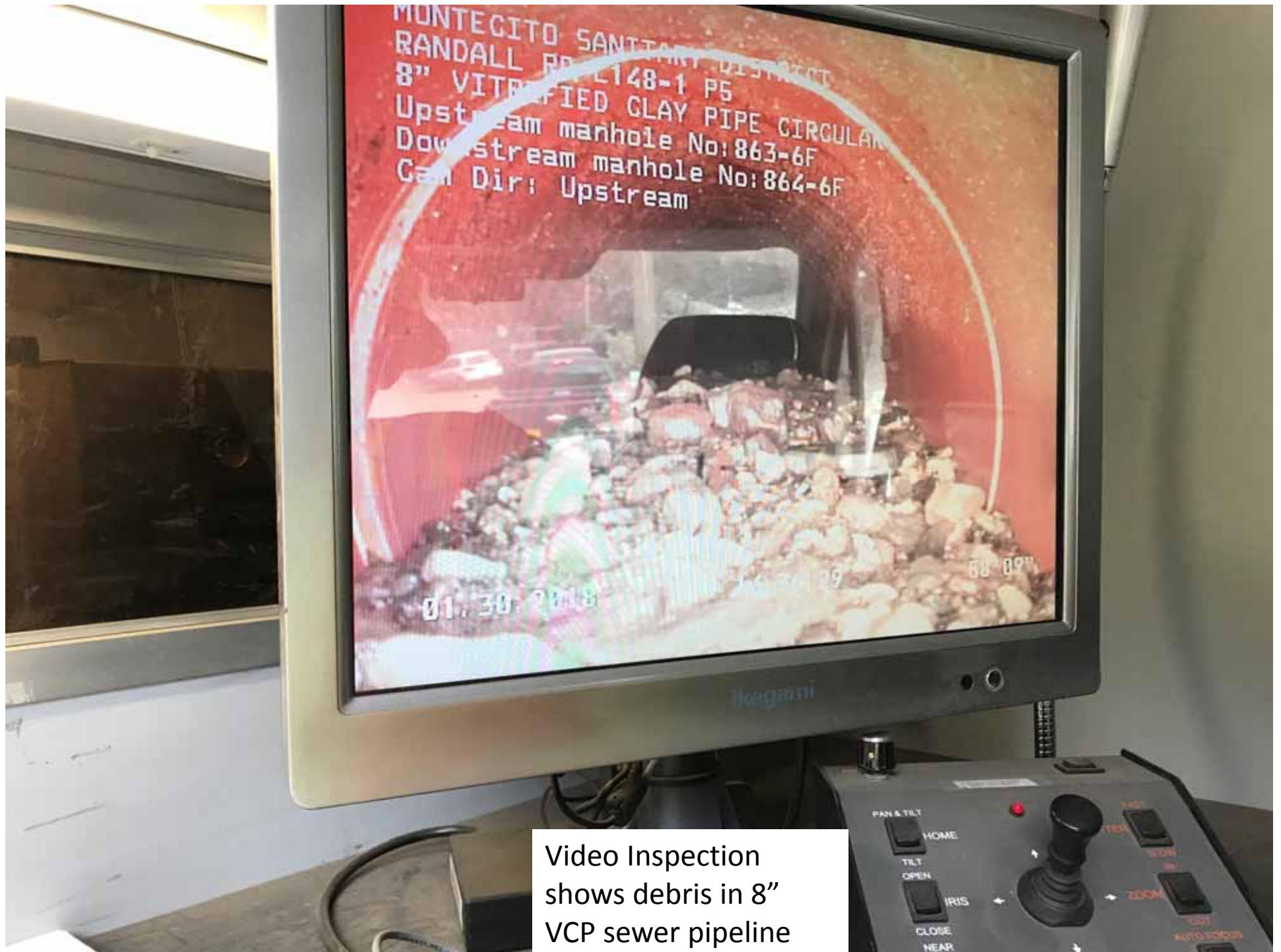




National Plant Services brought the mud and debris from the sewer manholes and pipelines to the MSD Sewer Treatment Plant to be processed



MSD hired National Plant Services to video inspect the pipelines to confirm debris was removed and assess the pipeline condition



Video Inspection shows debris in 8" VCP sewer pipeline



Upstream manhole No: 614-30
Downstream manhole No: 615-
Cam Dir: Downstream






Video Inspection
shows 6" rock in 8"
sewer pipeline

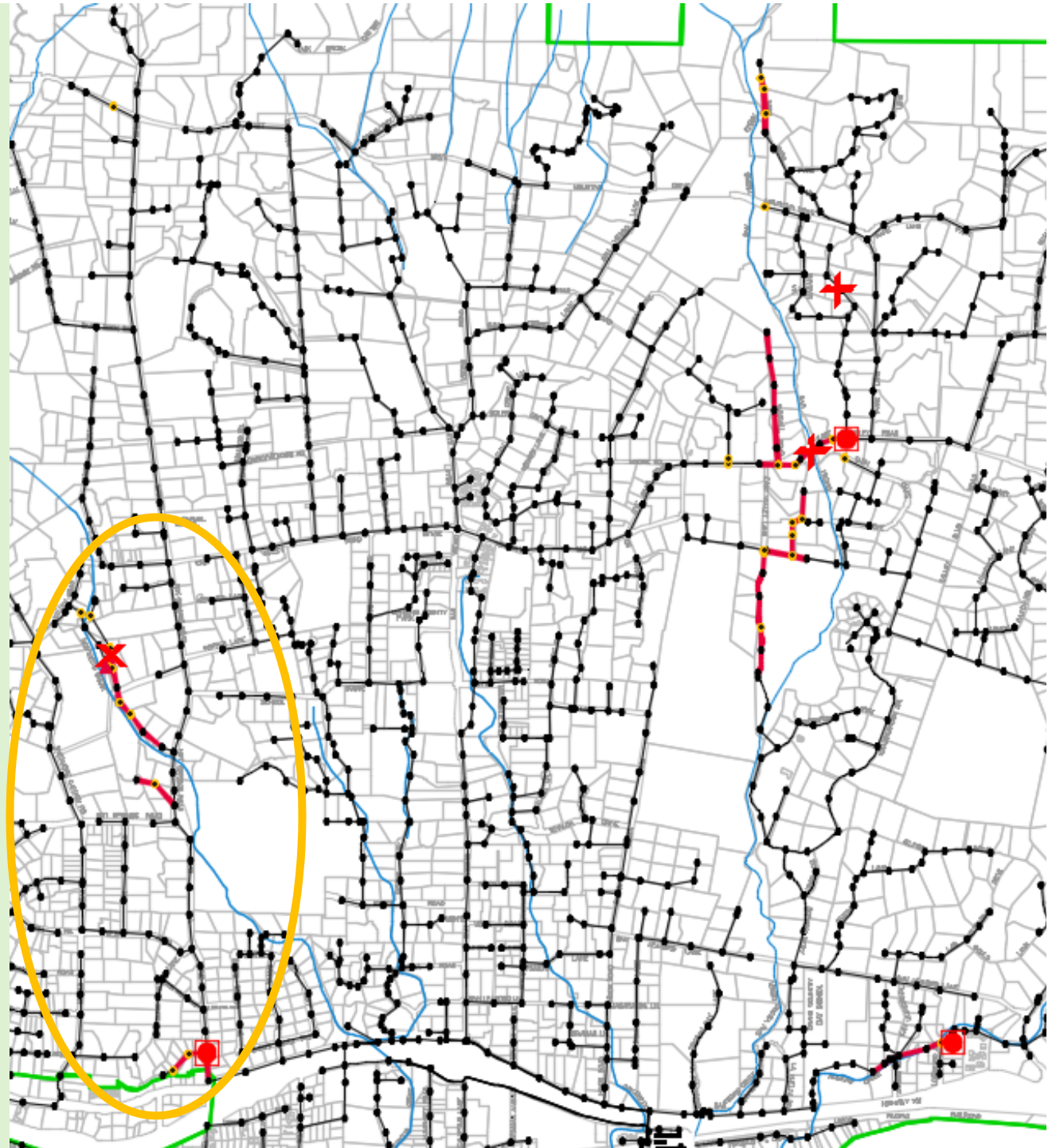
11:26:42

16'04"



COLLECTION SYSTEM DAMAGE- MONTECITO CREEK

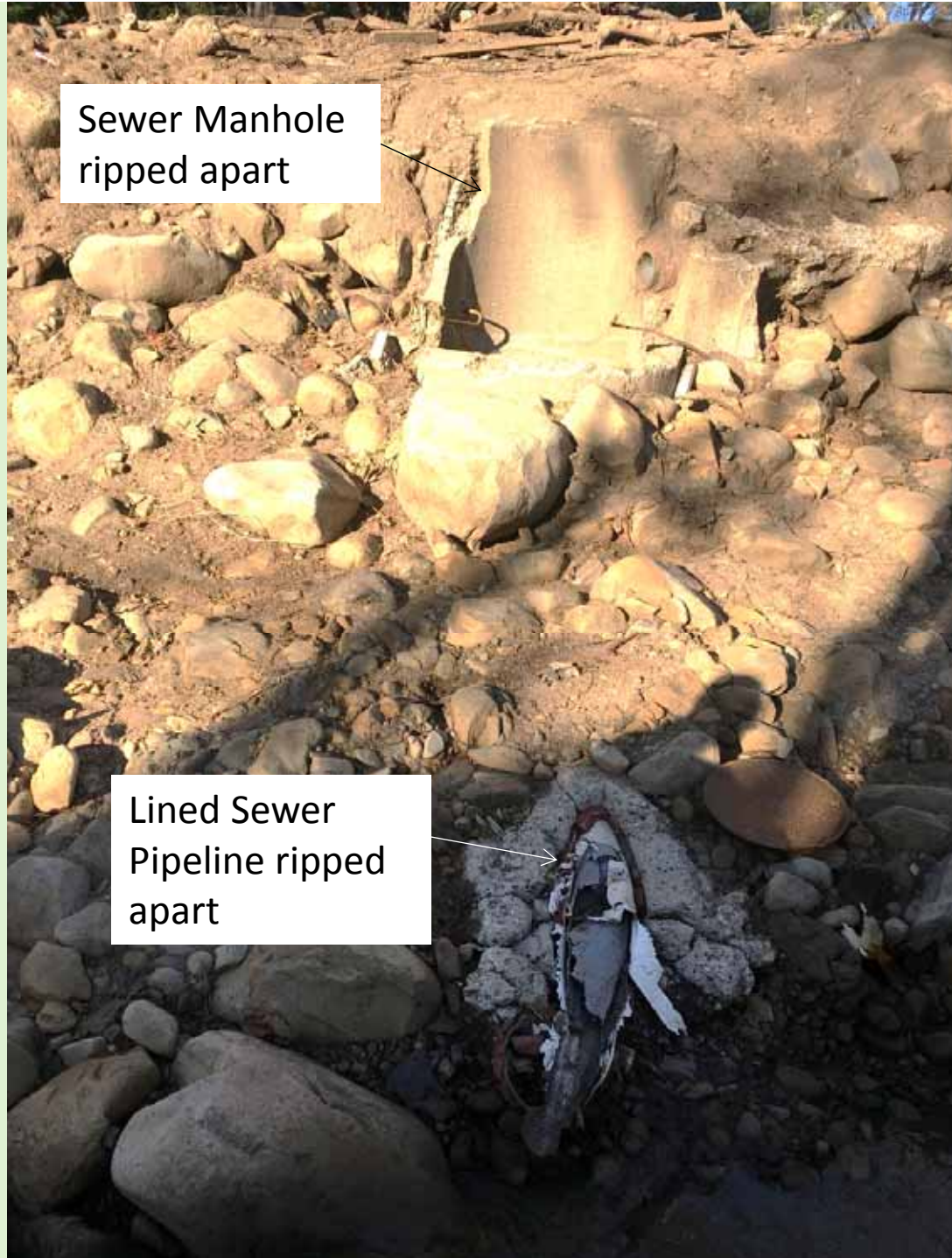
-  Sewer Pipeline Break
-  Sewer Pipeline full of Debris
-  Sanitary Sewer Overflow (due to storm water intrusion and debris blocked pipes)





Montecito
Creek

DAMAGED
MANHOLE AND
PIPELINE





MONTECITO CREEK

REPAIRS UNDERWAY

Blois
Construction,
hired by MSD,
repaired sewer
pipeline and
manhole



Sewer Manhole
ripped apart
marked in green



MONTECITO CREEK

REPAIRS UNDERWAY

Blois
Construction,
hired by MSD,
encased the
sewer pipeline
in concrete





MONTECITO CREEK


TODAY


Blois Construction, hired by MSD, repaired manhole, protected manhole with rocks, and concrete encased sewer pipeline




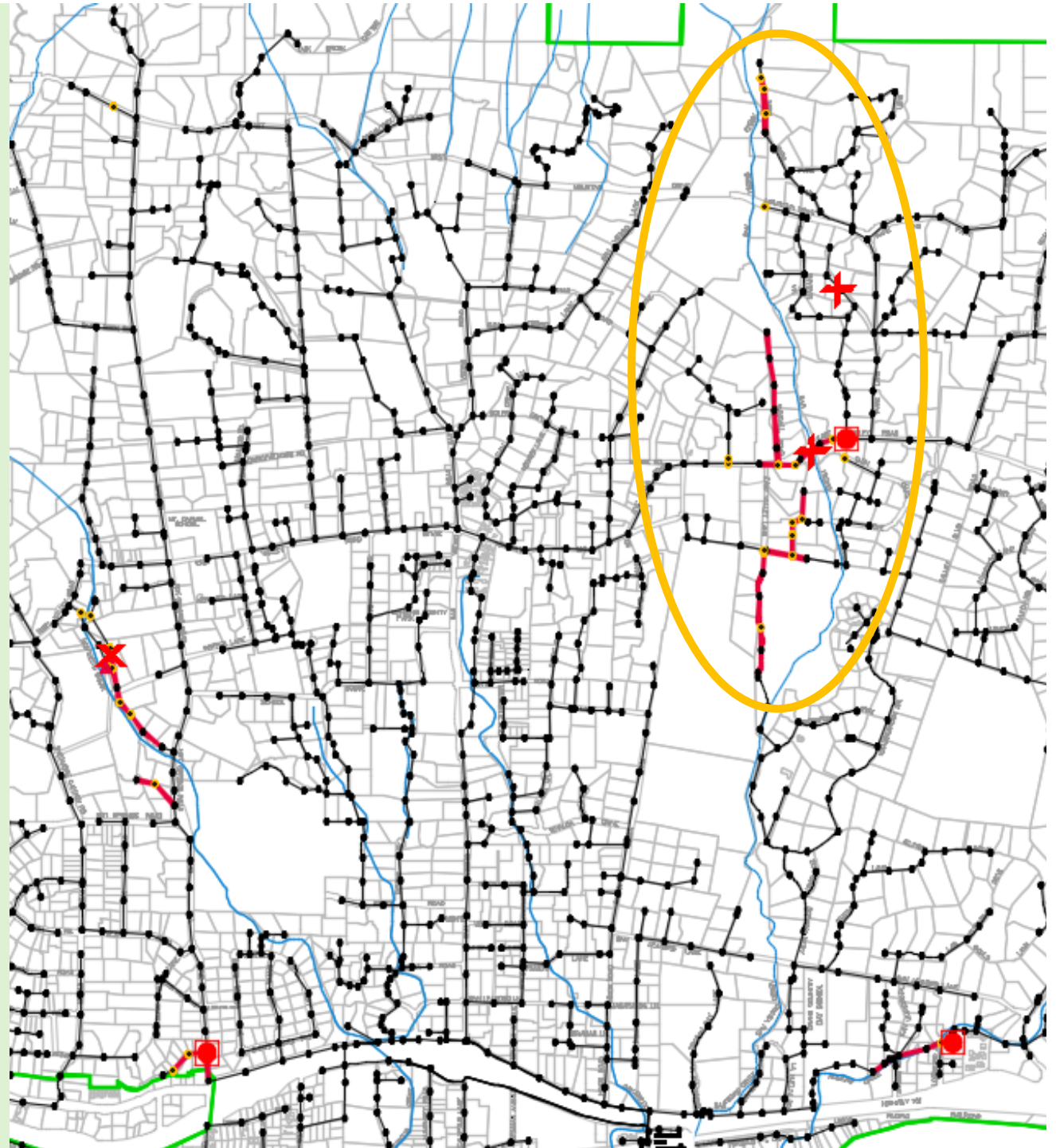


COLLECTION SYSTEM DAMAGE- SAN YSIDRO CREEK

 Sewer Pipeline Break

 Sewer Pipeline full of Debris

 Sanitary Sewer Overflow (due to storm water intrusion and debris blocked pipes)

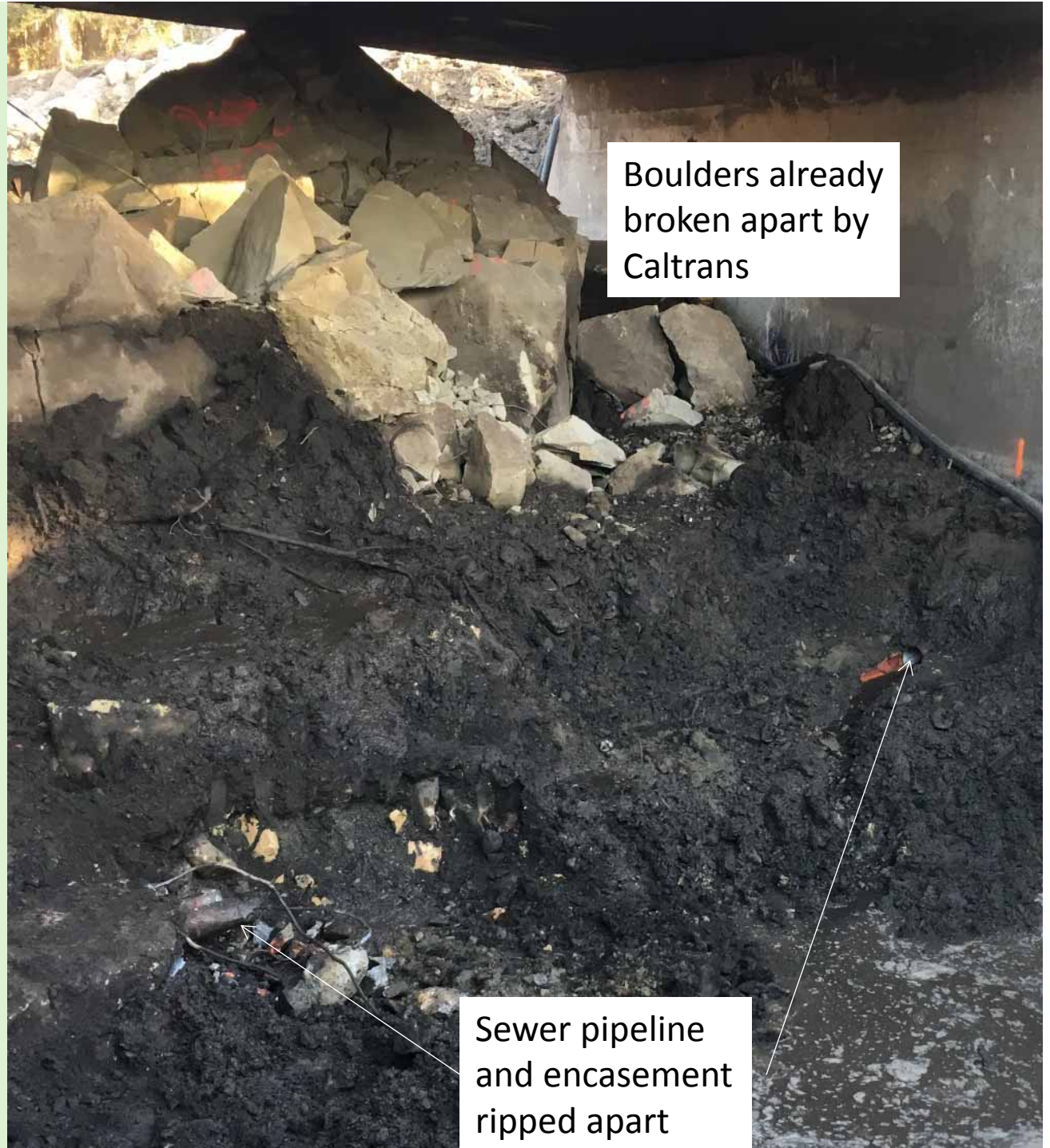




SAN YSIDRO CREEK UNDER EAST VALLEY ROAD BRIDGE

DAMAGED PIPELINE

Caltrans and County
Flood Control granted
MSD a 48 hour time
period to complete the
pipeline repairs





SAN YSIDRO CREEK UNDER EAST VALLEY ROAD BRIDGE

SEWER PIPE IN CASING

MSD hired Blois
Construction to
complete repairs

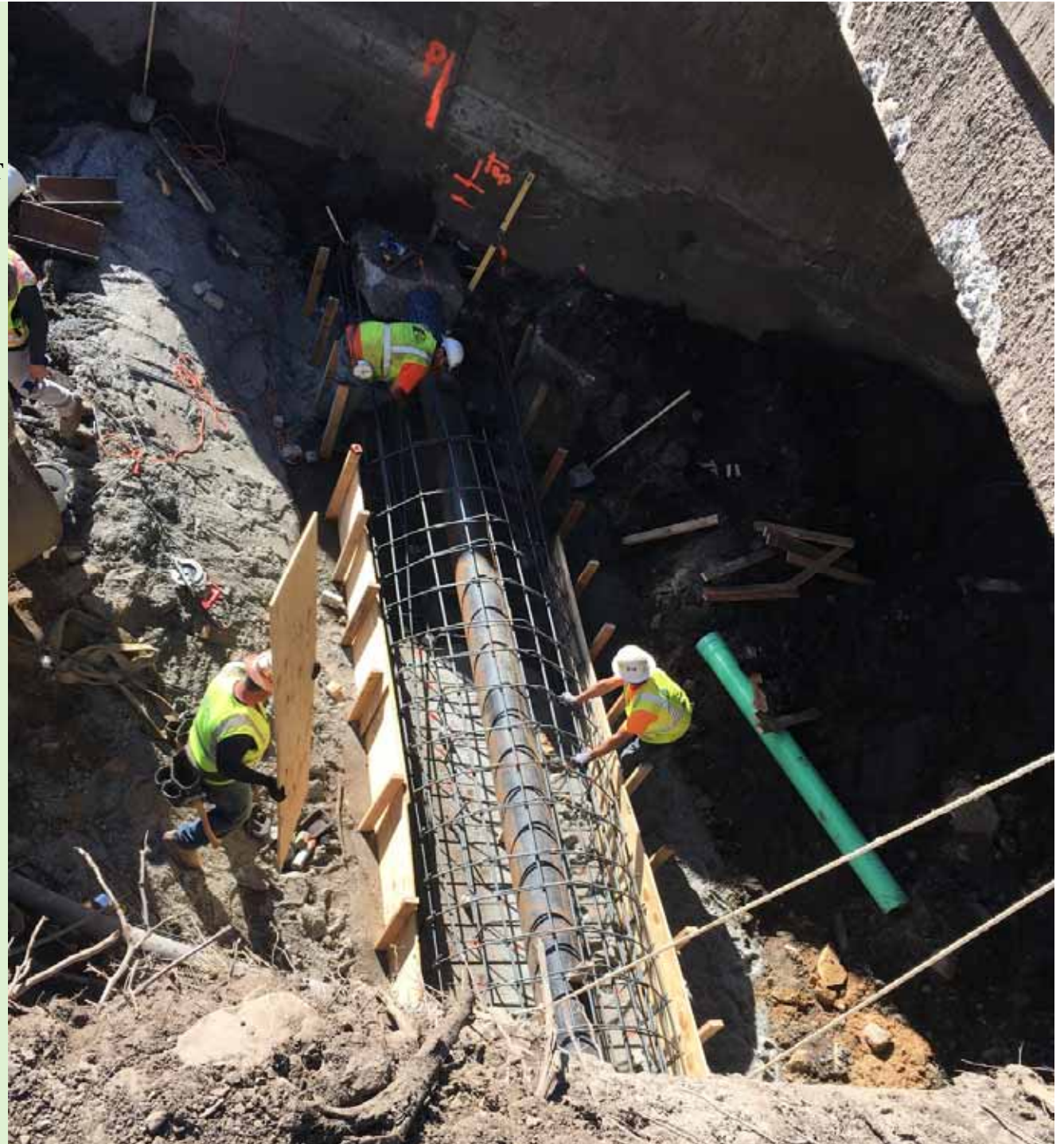


Blois Construction, hired by MSD, installed 8" PVC gravity pipe in a steel casing that will be encased in reinforced concrete



SAN YSIDRO
CREEK UNDER
EAST VALLEY
ROAD BRIDGE

REBAR FOR
CONCRETE
ENCASEMENT





SAN YSIDRO
CREEK UNDER
EAST VALLEY
ROAD BRIDGE

CONCRETE
ENCASEMENT





San Ysidro
Creek under
East Valley
Road Bridge

ENCASED
PIPELINE



Repaired concrete encased
sewer pipeline



San Ysidro Creek under East Valley Road Bridge




TODAY

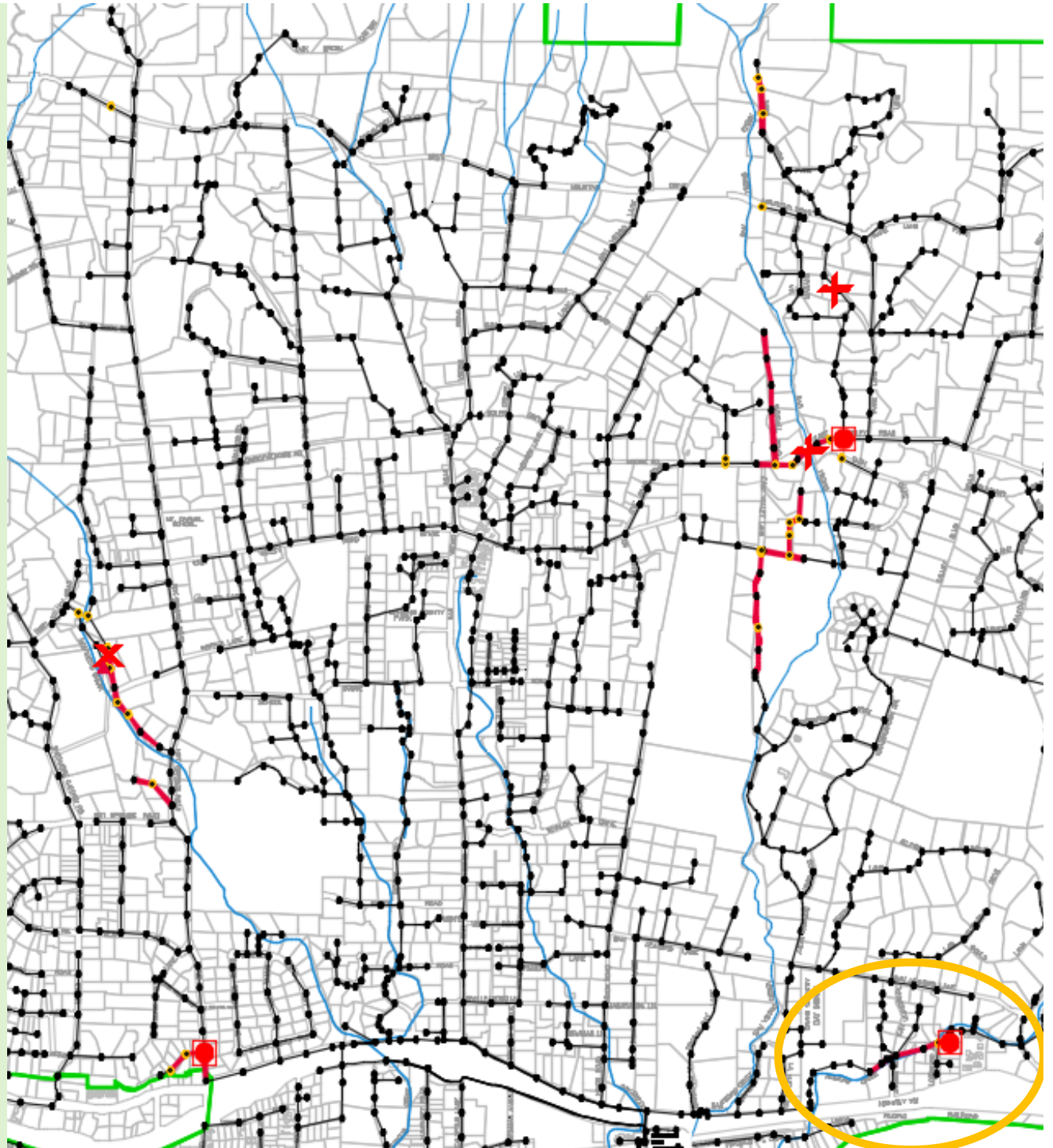
The concrete encased
sewer pipeline is below
the natural creek
channel





COLLECTION SYSTEM DAMAGE- ROMERO CREEK

-  Sewer Pipeline Break
-  Sewer Pipeline full of Debris
-  Sanitary Sewer Overflow (due to storm water intrusion and debris blocked pipes)





ROMERO CREEK

DAMAGED PIPELINE

MSD hired Blois
Construction to repair
the damaged concrete
encasement surrounding
the sewer main





ROMERO CREEK

REPAIRED PIPELINE AND ENCASEMENT

Blois Construction
repaired the damaged
concrete encasement
surrounding the sewer
main





ROMERO
CREEK

ENCASED
PIPELINE

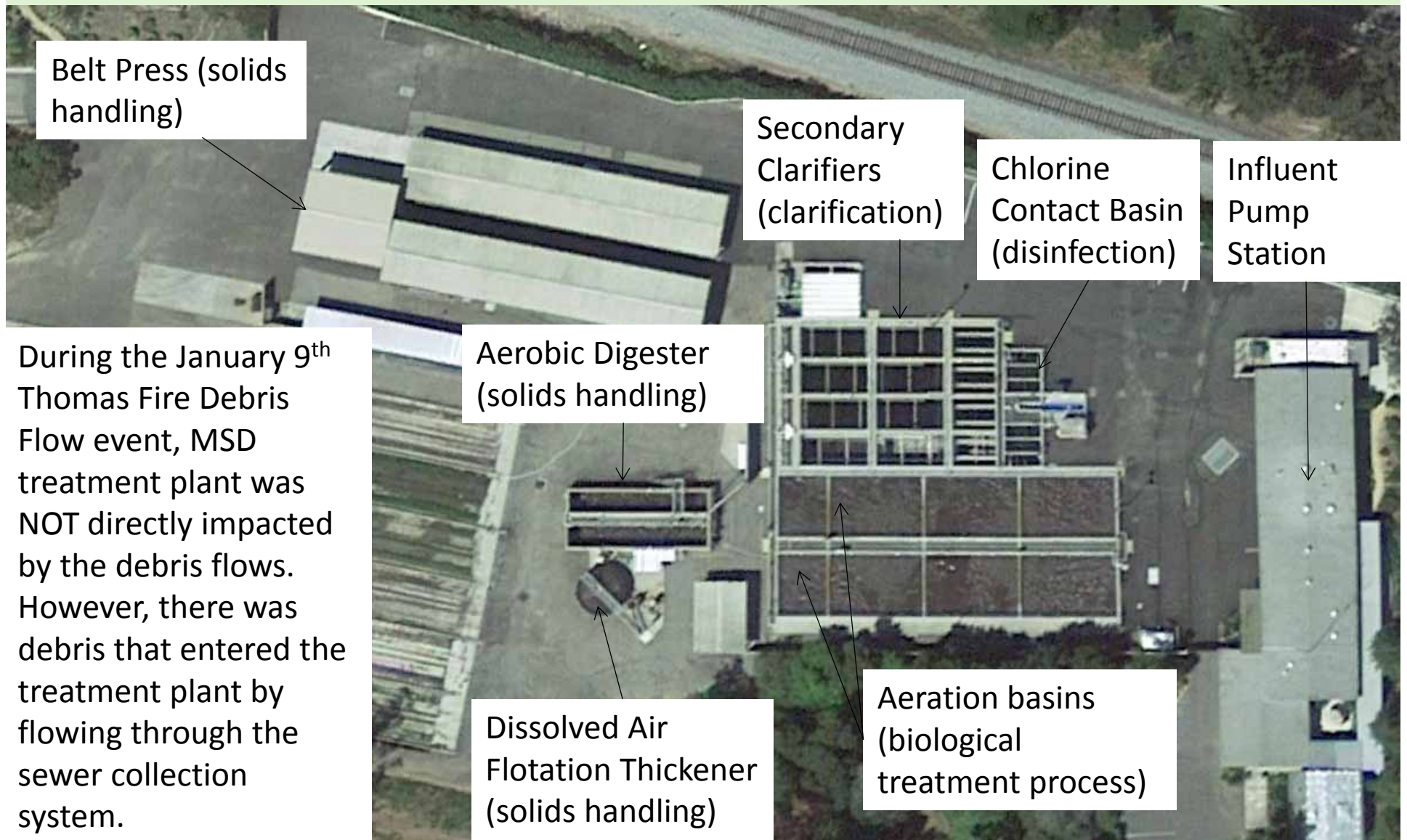
TODAY



Repaired concrete
encasement around
sewer pipeline



MSD Treatment Plant





Influent Flow

Typical day influent is tan in color, has a trace amount of solids material, and has a musty odor



Typical Day

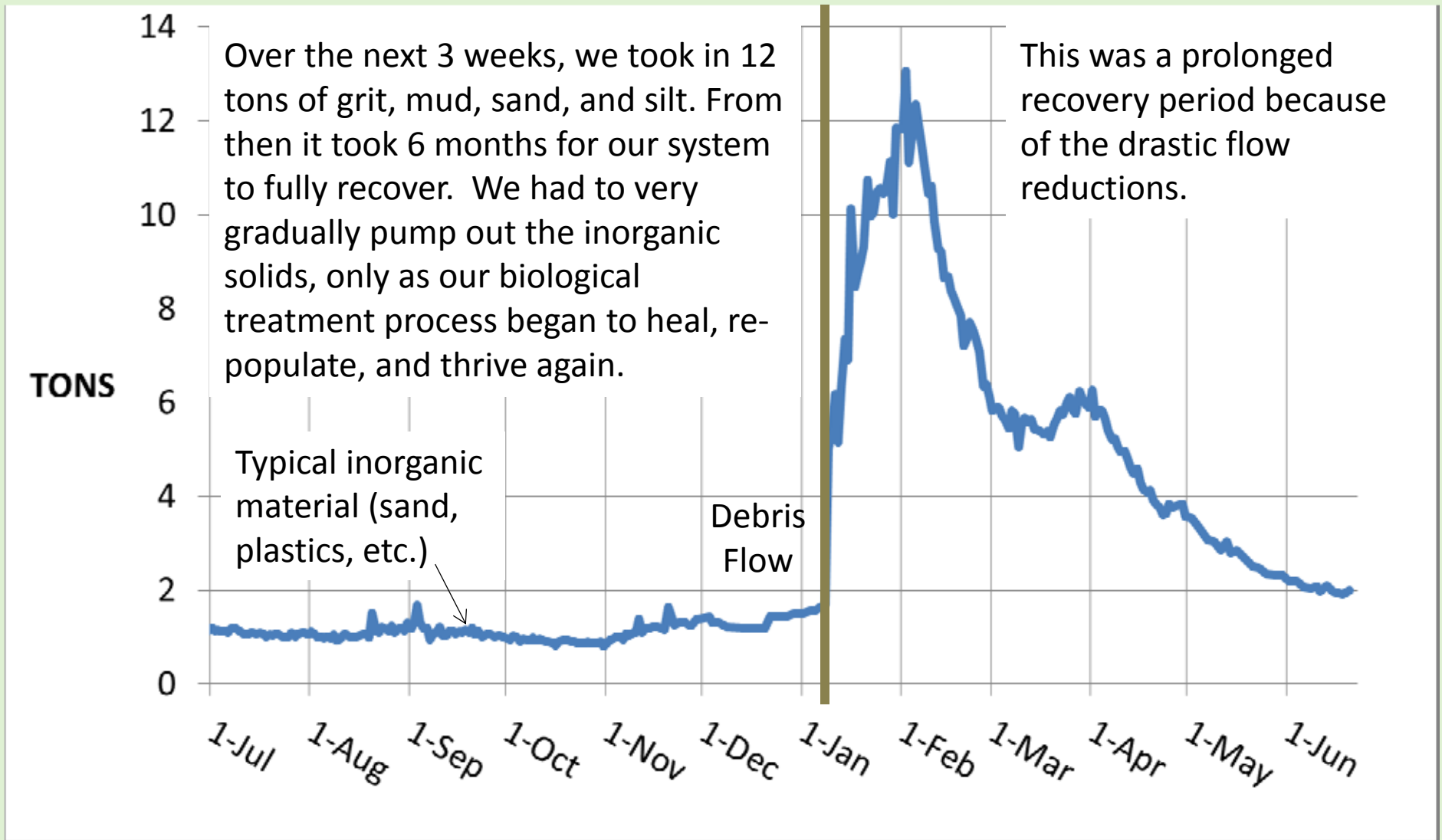


January 9, 2018

On the morning of the debris flow influent was a blackish-brown slurry and had an earthy odor; the debris in the collection system was making its way to the treatment plant. This is what the influent flow looked like for weeks.

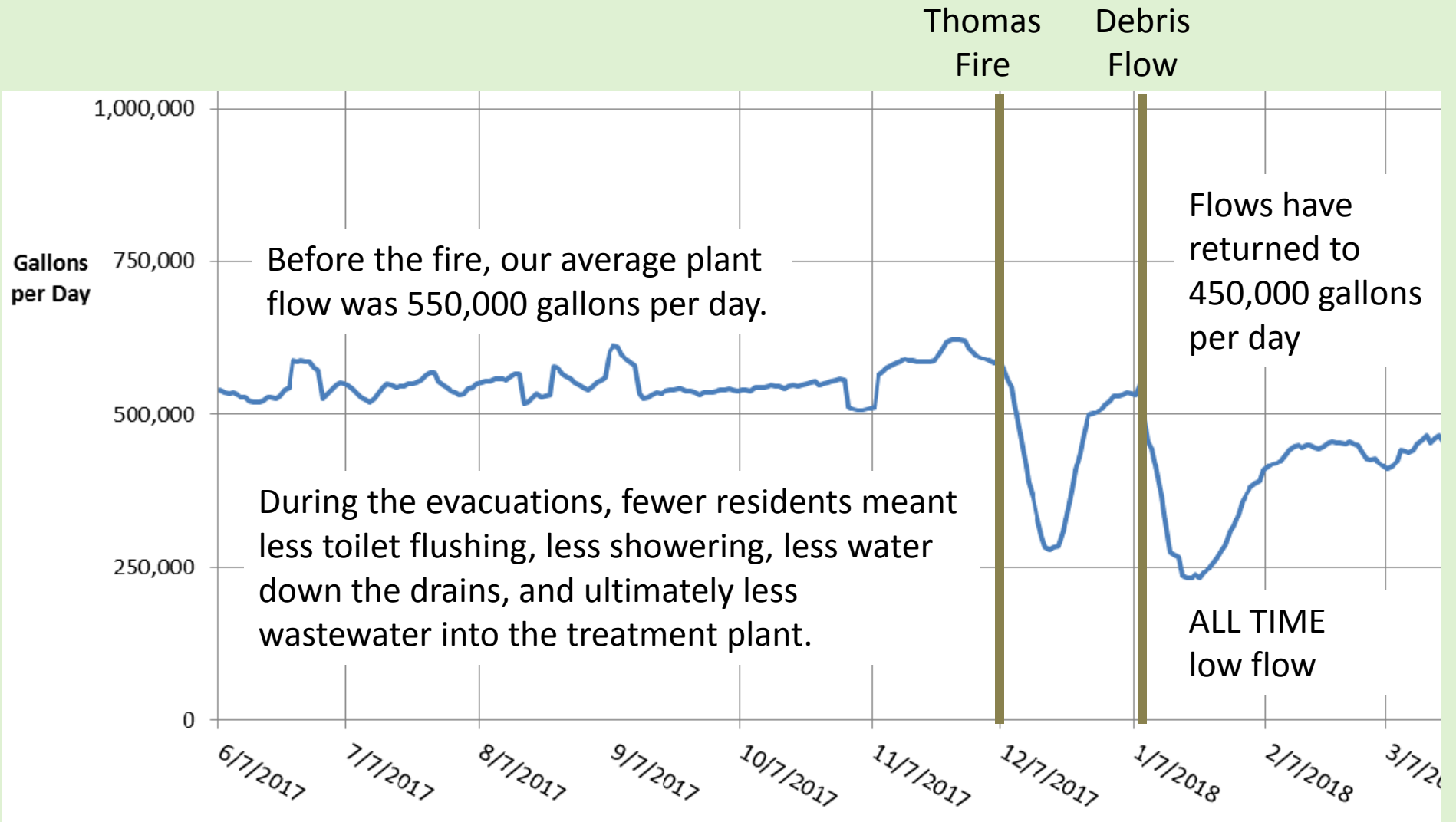


Inorganic Material in Treatment Plant





Plant Flow (gallons per day)



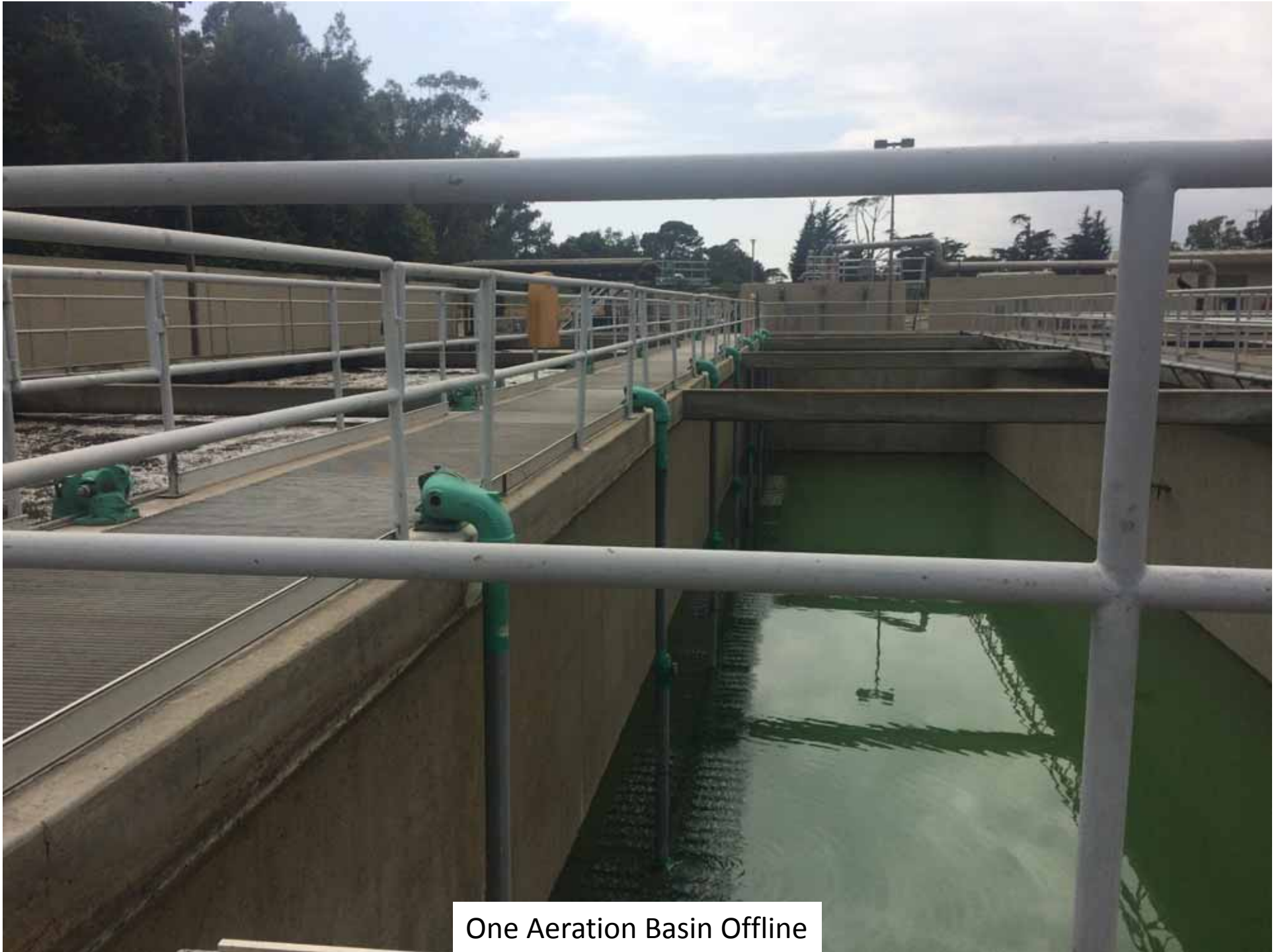


Adapting to flow reduction



With very low flows to the treatment plant both the hydraulic and the solids residence times in these tanks were far beyond our target ranges. As the flow into the plant dropped below half of normal, we took half of our tanks offline.

As you can see with the red X, we took an aeration basin offline, followed by two clarifiers.



One Aeration Basin Offline



Secondary Clarifier Offline



Sustaining Plant Microbiology

Once we adapted to the low flows, our next challenge was sustaining the health of our plant microbiology. Our treatment process is absolutely reliant on living, breathing microorganisms that we receive regularly when we are receiving human sanitary sewer waste. These microorganisms, among others, are what we like to see. When these microorganisms are thriving, our treatment performance is at its best.

Stalked Ciliates





Preventing Worms

These worms are associated with sub-optimal treatment performance. After the debris flow, we were striving to prevent these worms by maintaining the healthy, beneficial microorganisms that ultimately keep us in permit compliance. Human sanitary sewer waste is the food that good microorganisms need to eat in order to live. After the debris flow, our microorganisms were basically starving.





Sustaining Plant Microbiology

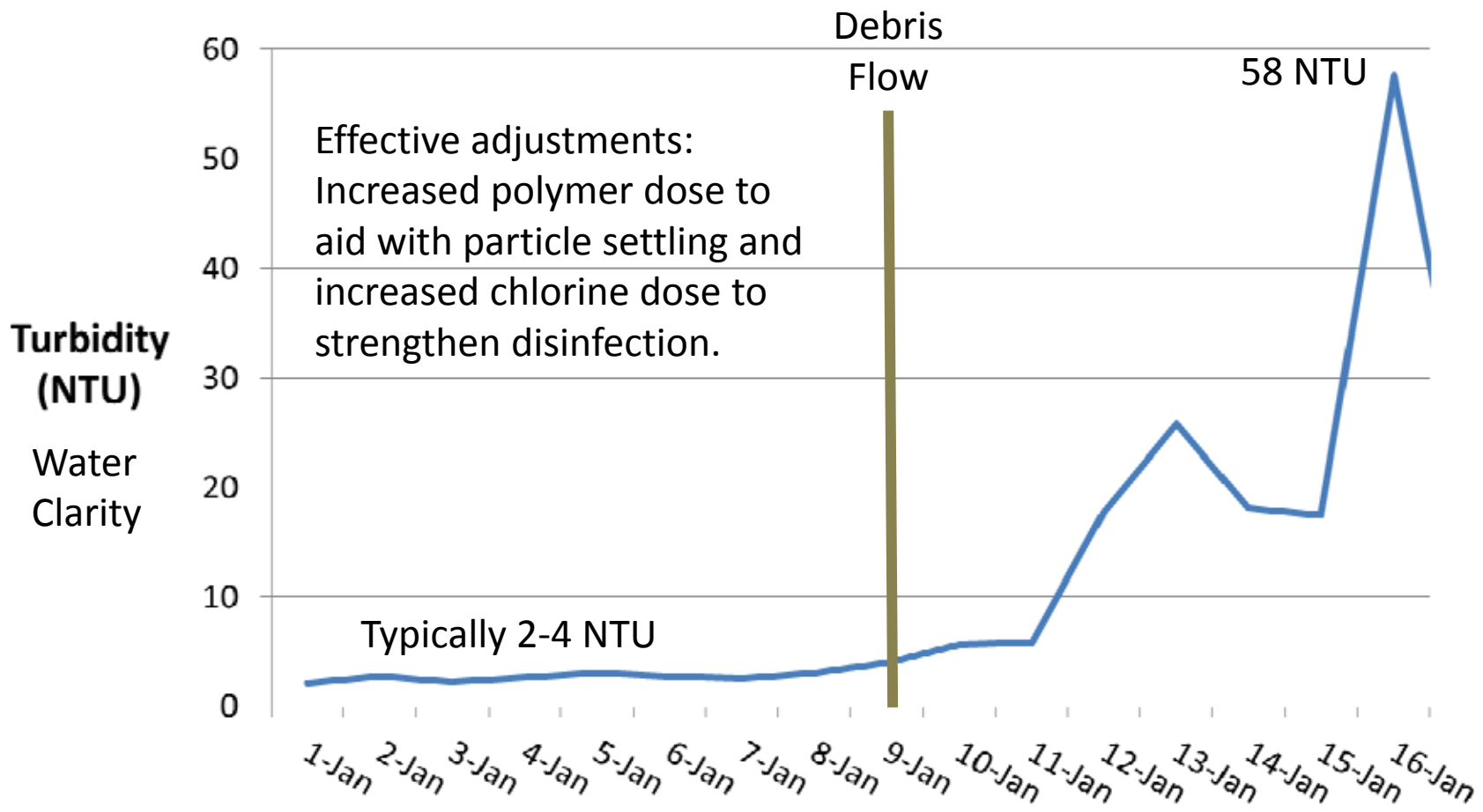
We needed a supplemental food source to keep the healthy microorganisms alive. We added dogfood as an alternative food source. In the wastewater industry, it is not uncommon to use dogfood in this application. We supplemented with dogfood for 17 days (150 lbs per day) until Montecito was repopulated and the plant started to receive human sanitary sewer waste again.





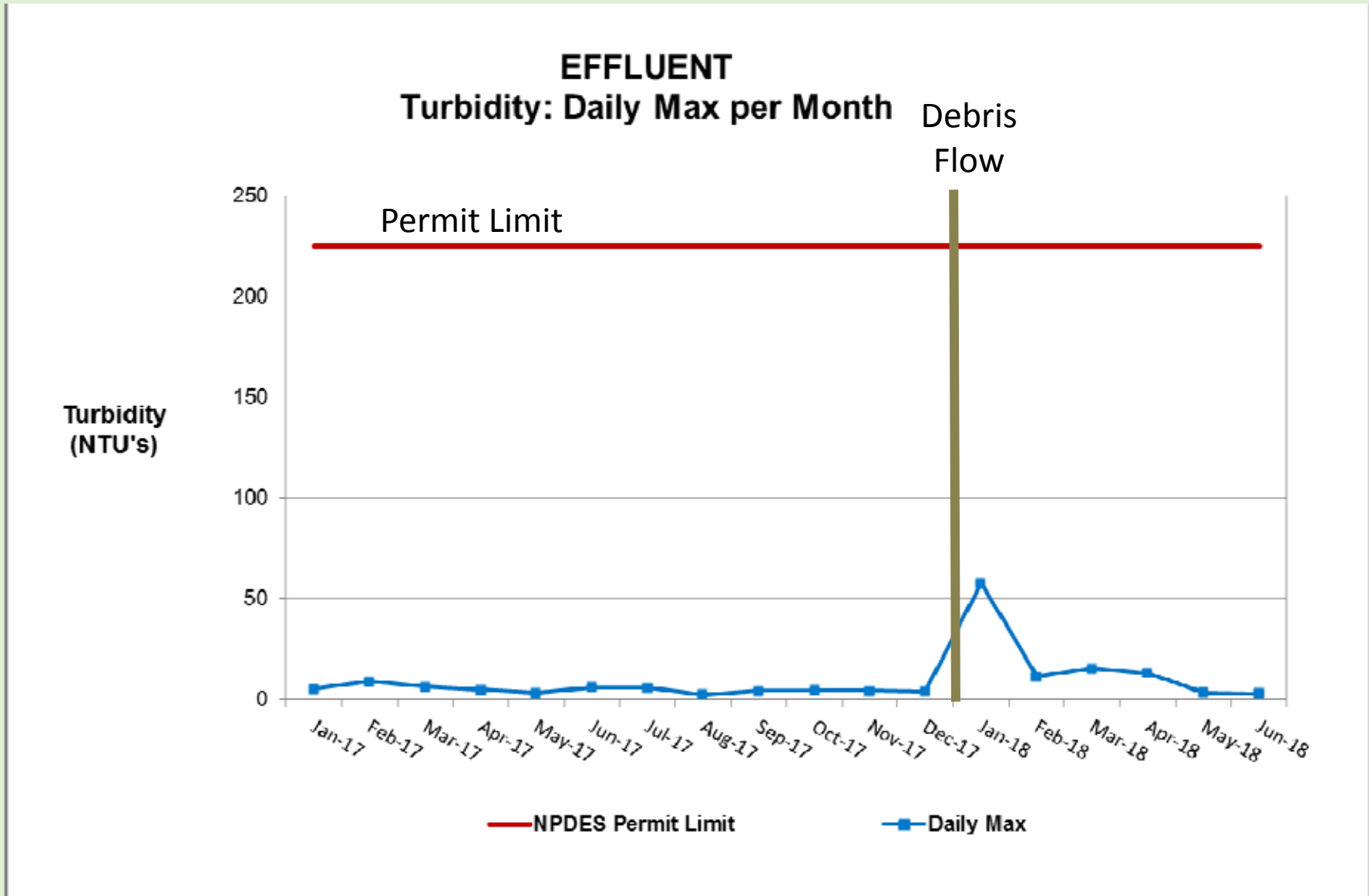
Analyzing Trends

January 2018 Effluent Turbidity





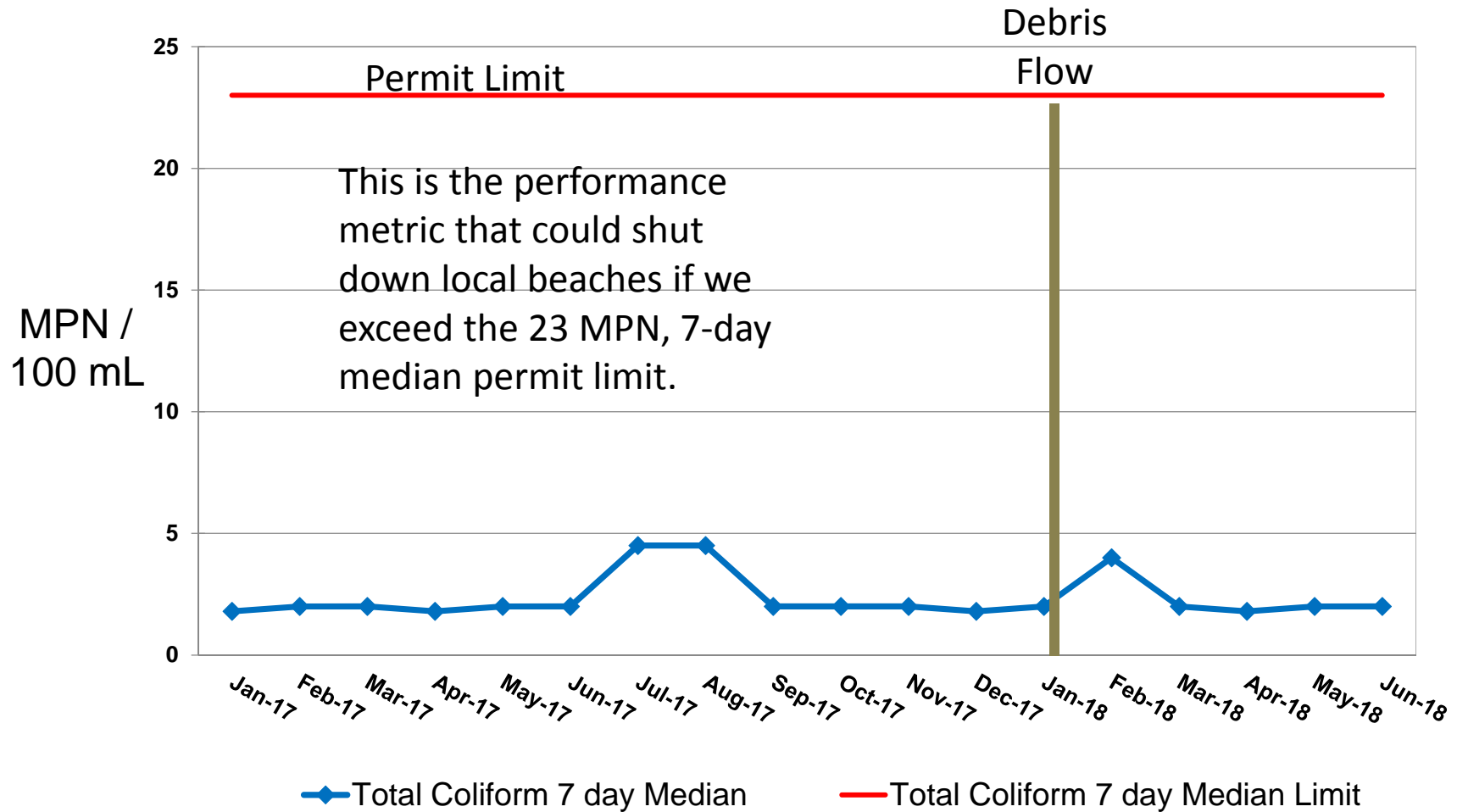
Effluent Turbidity





Total Coliform

EFFLUENT Total Coliform Monthly 7-day Median

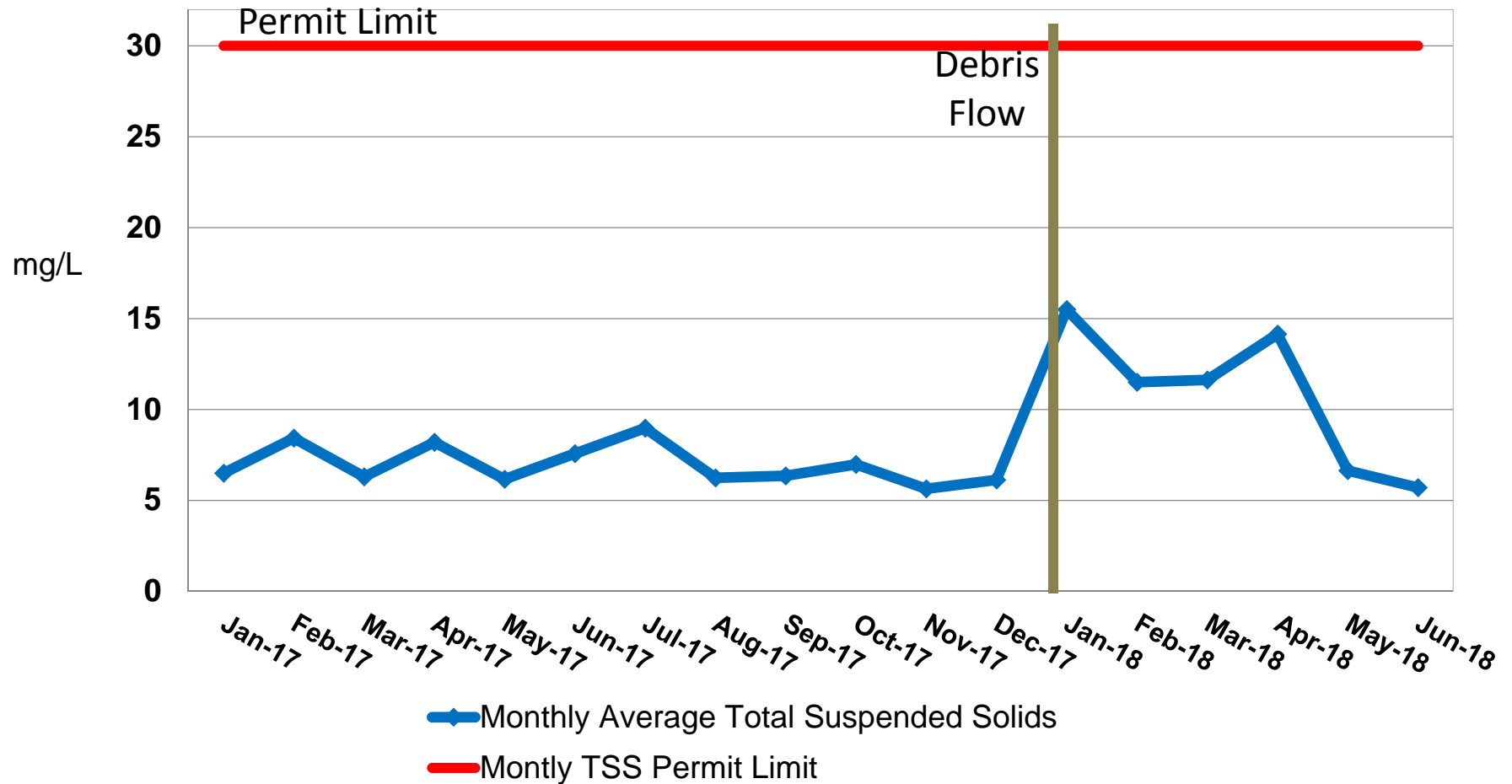




Effluent TSS

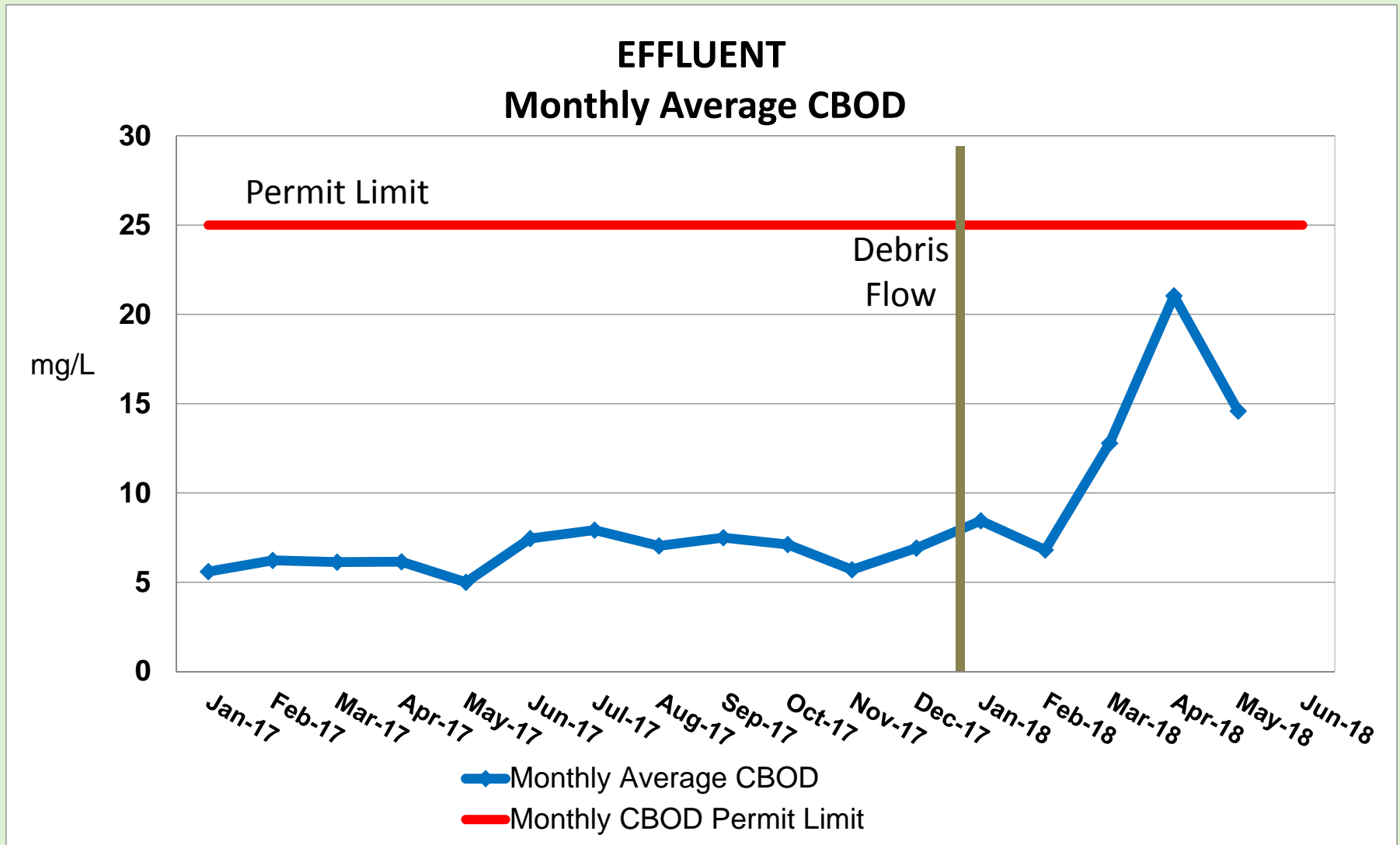
EFFLUENT

Monthly Average Total Suspended Solids





Effluent CBOD





Effluent Flow Discharged to the Ocean

Effluent is crystal clear



Typical Day



Effluent is quite clear

January 9, 2018



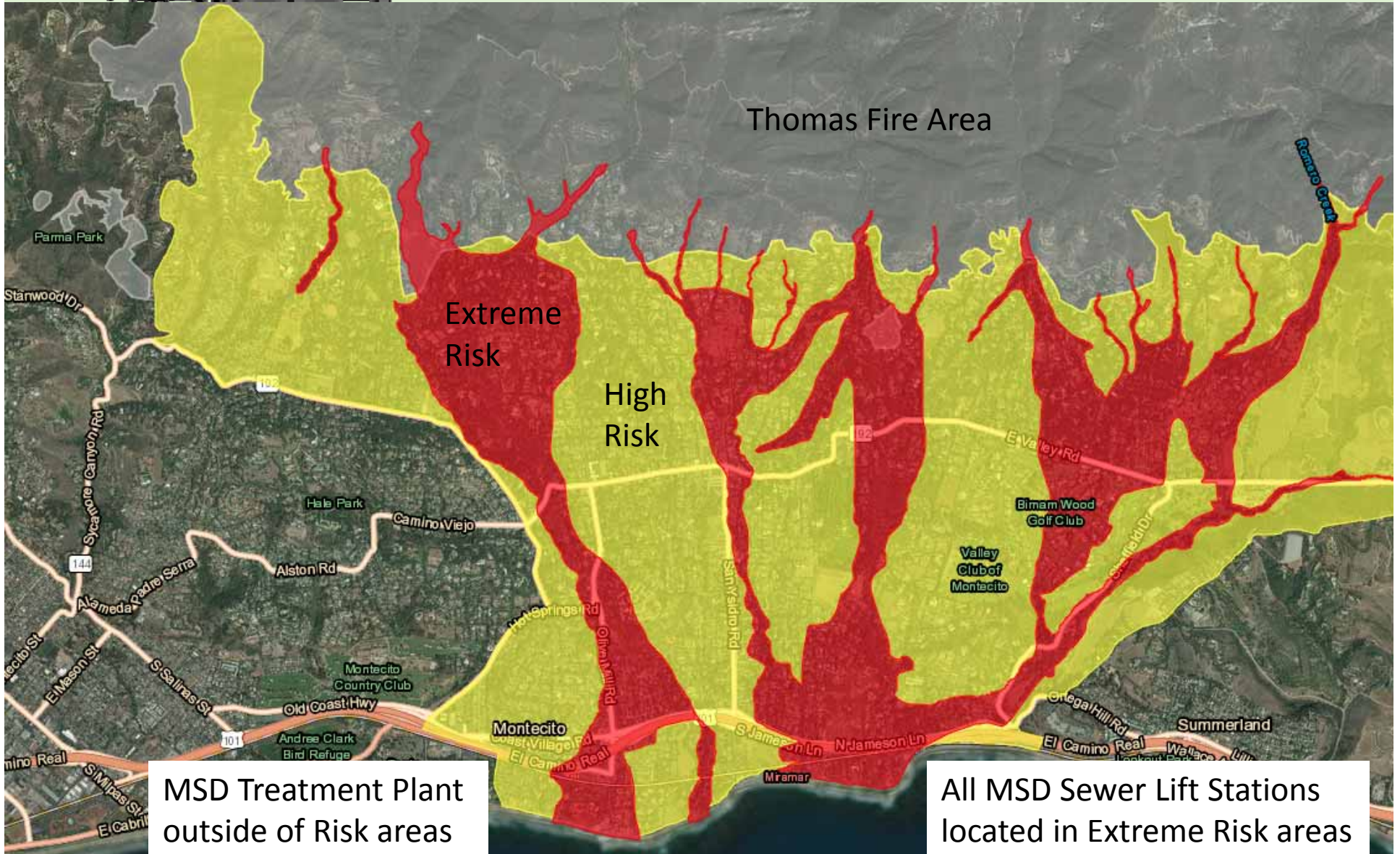
Repopulation following Debris Flow

- January 21st - Highway 101 reopens after removing 105,000 cubic yards of material with 40 pieces of equipment and 1,500 trucks
- January 23rd all repairs to Collection system completed
- January 23rd - Repopulation of Montecito begins
- January 30th - Repopulation of Montecito complete



Risk Areas

(Loss of Life or Property)



MSD Treatment Plant
outside of Risk areas

All MSD Sewer Lift Stations
located in Extreme Risk areas



Recent Evacuations

- Thursday, March 1st 6 PM – Mandatory evacuation for all of Montecito, evacuation lifted next day
- Monday, March 12th 8 PM – Mandatory evacuation for extreme risks areas, evacuation lifted next day
- Tuesday, March 20th 5 PM- Mandatory evacuation for all of Montecito, evacuation lifted March 22nd at 5 PM



Preparations

- Leased Vactor
- Lateral Cap Locations
- Pipeline Protectors in Manholes
- Sand Bags

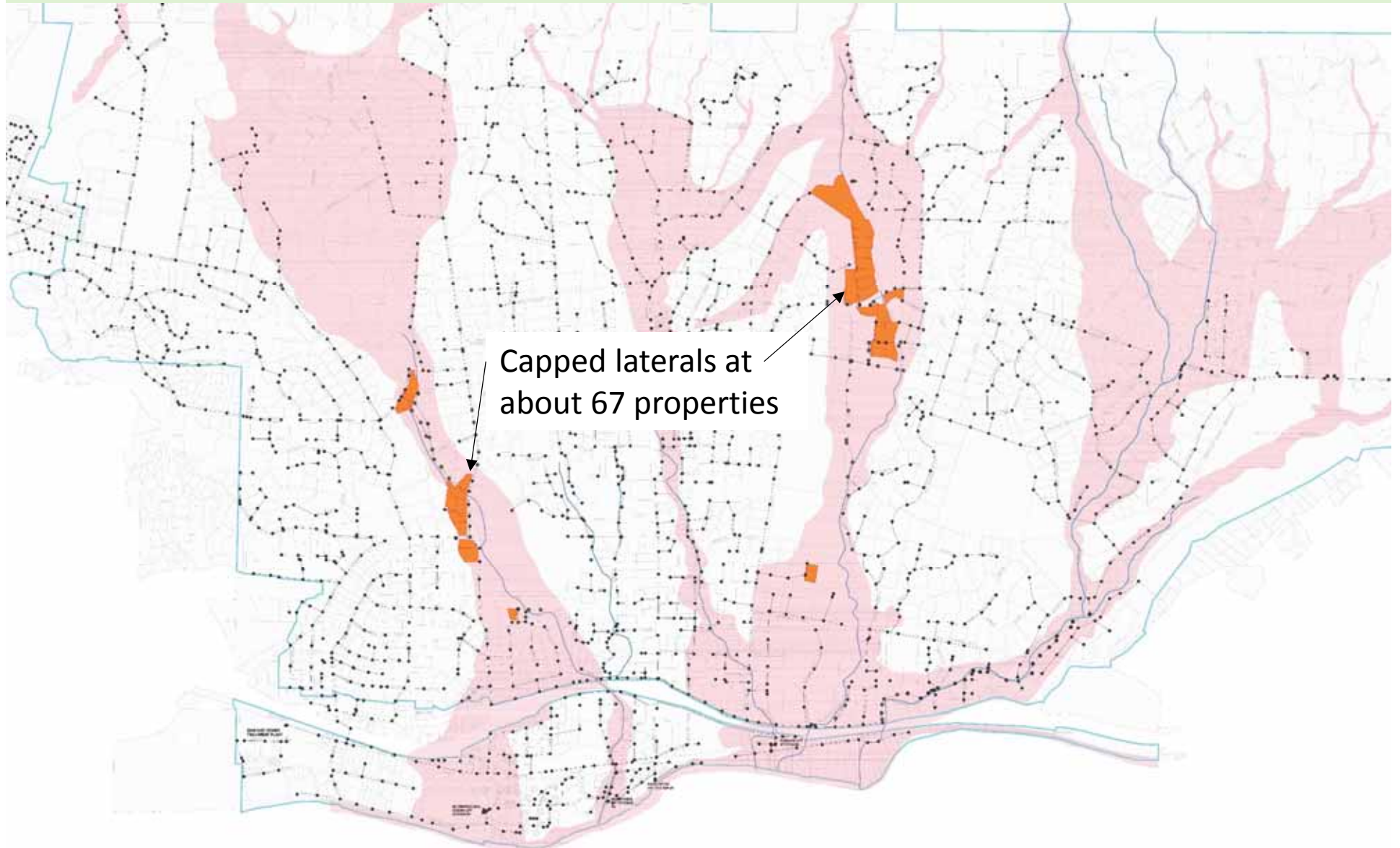


Leased Sewer Cleaning Machine





Capped Laterals





Pipeline Protectors



If the manhole lid floats away during a future debris flow the protector would capture the debris and prevent it from entering the pipeline system. The protector is foldable for easy installation.



Pipeline Protectors



Protectors can be lowered by one person without having to enter the manhole.



The plywood sits on the manhole concrete shelf which allows sewer to continue flow to the next pipeline.

Sand Bags



In February sand bags were placed to prevent future debris flows from entering the lift station. The sand bags were removed in May after the rainy season.



On-Site Diesel Storage



Diesel storage is located at the MSD Treatment Plant for the backup generator.



Backup Generator

Diesel Generator has an automatic transfer switch, is capable of powering the entire facility, and is tested monthly





Auxiliary Pump and Piping



An additional auxiliary pump and piping could be used if influent flow to the treatment plant or lift stations are very high.



Plans for FY-2018-2019

- Preparations for potential future debris flows
- FEMA reimbursement
- Continue full NPDES permit compliance



Questions

Please call Diane Gabriel, General Manager
at 805-969-4200