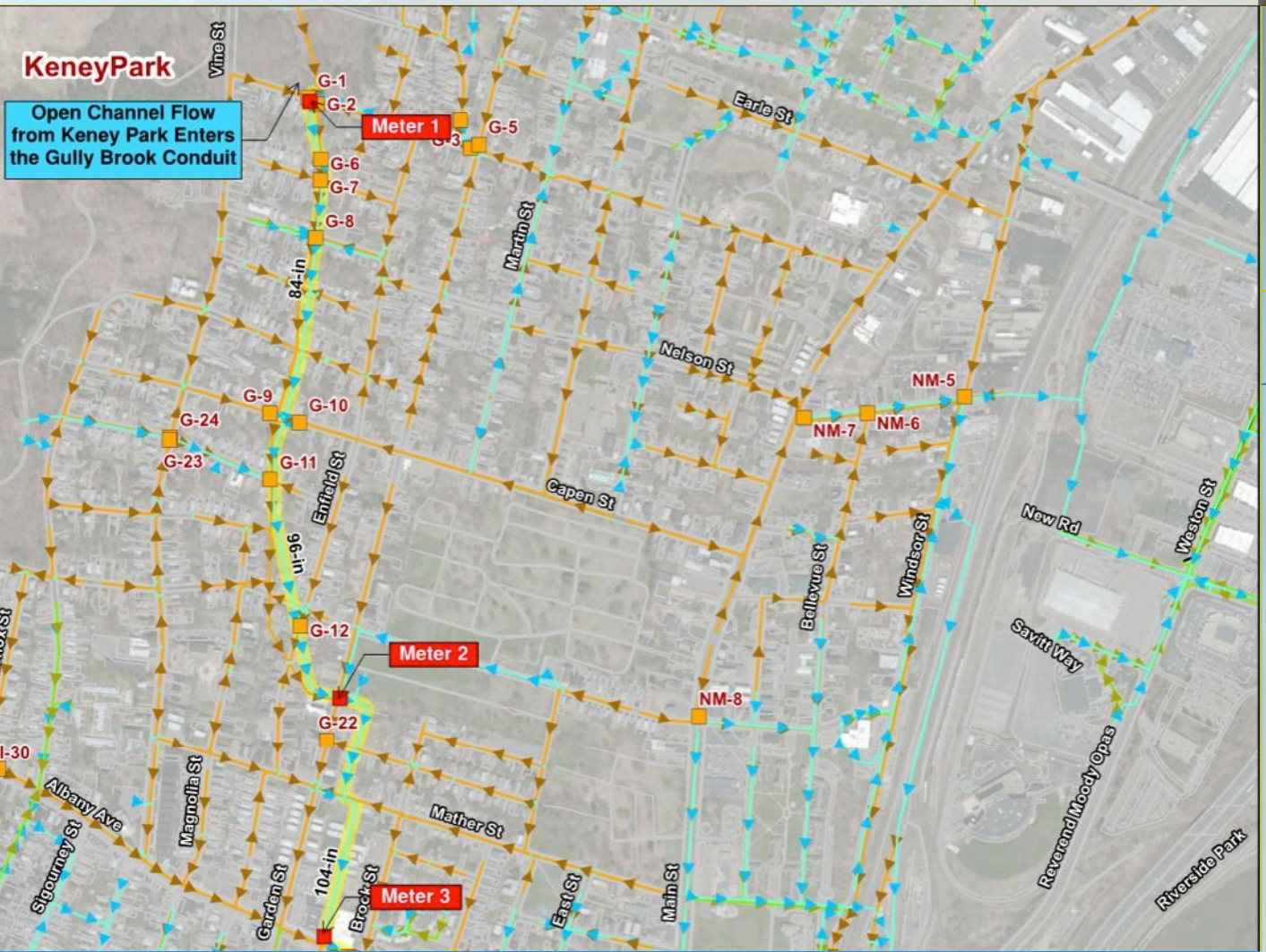
Gully Brook Conduit Sewer Connection Detection and Inspection Program

The Metropolitan District Commission – Hartford, CT



Cynthia A. Baumann, P.E.
Jason Waterbury, P.E.
Joseph L. Laliberte, P.E.

January 25, 2016

CDM Smith

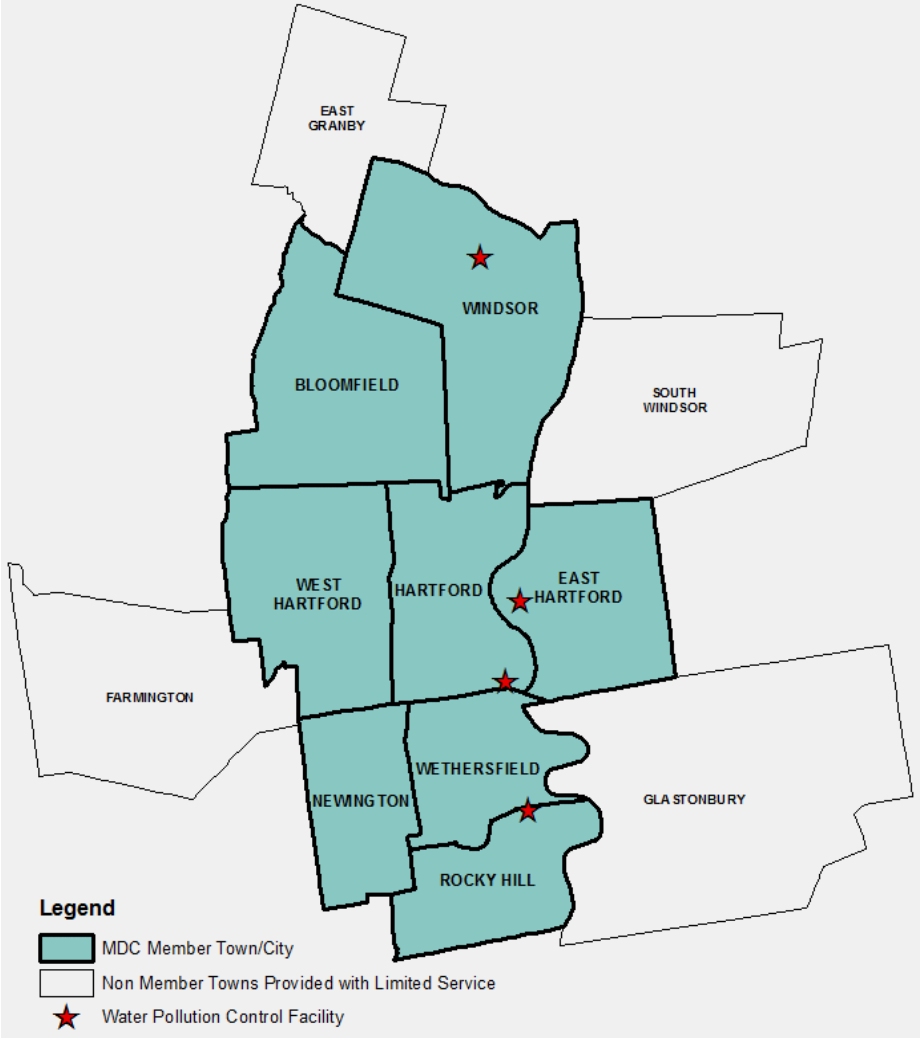
MDC

Introduction

The MDC is a nonprofit municipal corporation chartered by the Connecticut General Assembly in 1929

Our mission is to provide our customers with safe, pure drinking water, environmentally protective wastewater collection and treatment and other services that benefit the member towns

We provide water, sewer and household hazardous waste collection to its member towns and treated water to portions of non-member towns

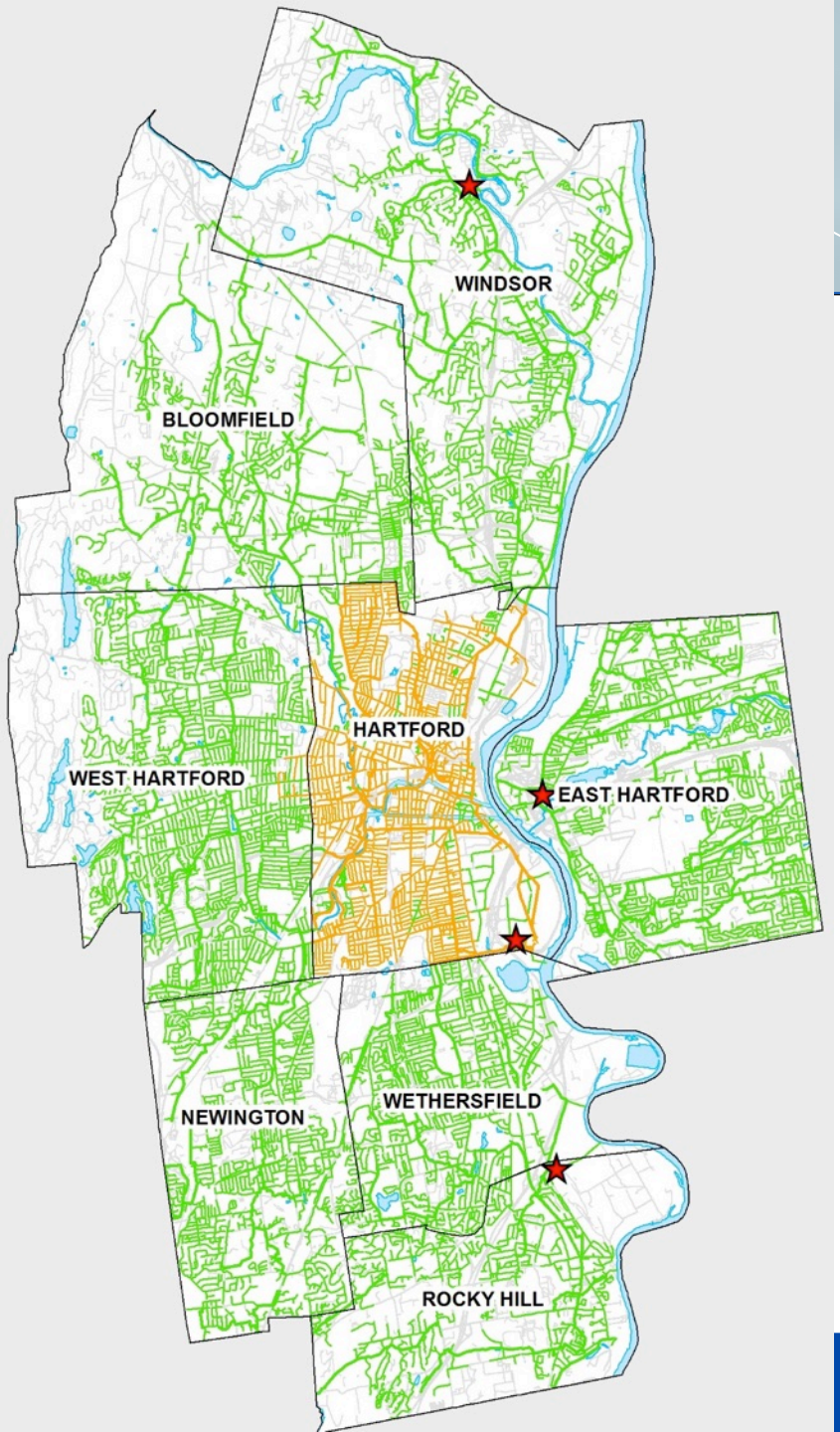


Presentation Outline

- Background
- Approach
  - Illicit Sanitary Connection Investigation
- Recommendations
- Results

MDC's Sewer System

- Serves approx. 400,000 people from 8 towns
- 4 water pollution control facilities (WPCF)
- ~1,200 miles of sewers dating back to 1850s
- Of the 1,200 miles of sewer, 187 miles are combined (primarily in Hartford)
- Approximately 1 billion gallons of overflows in typical year



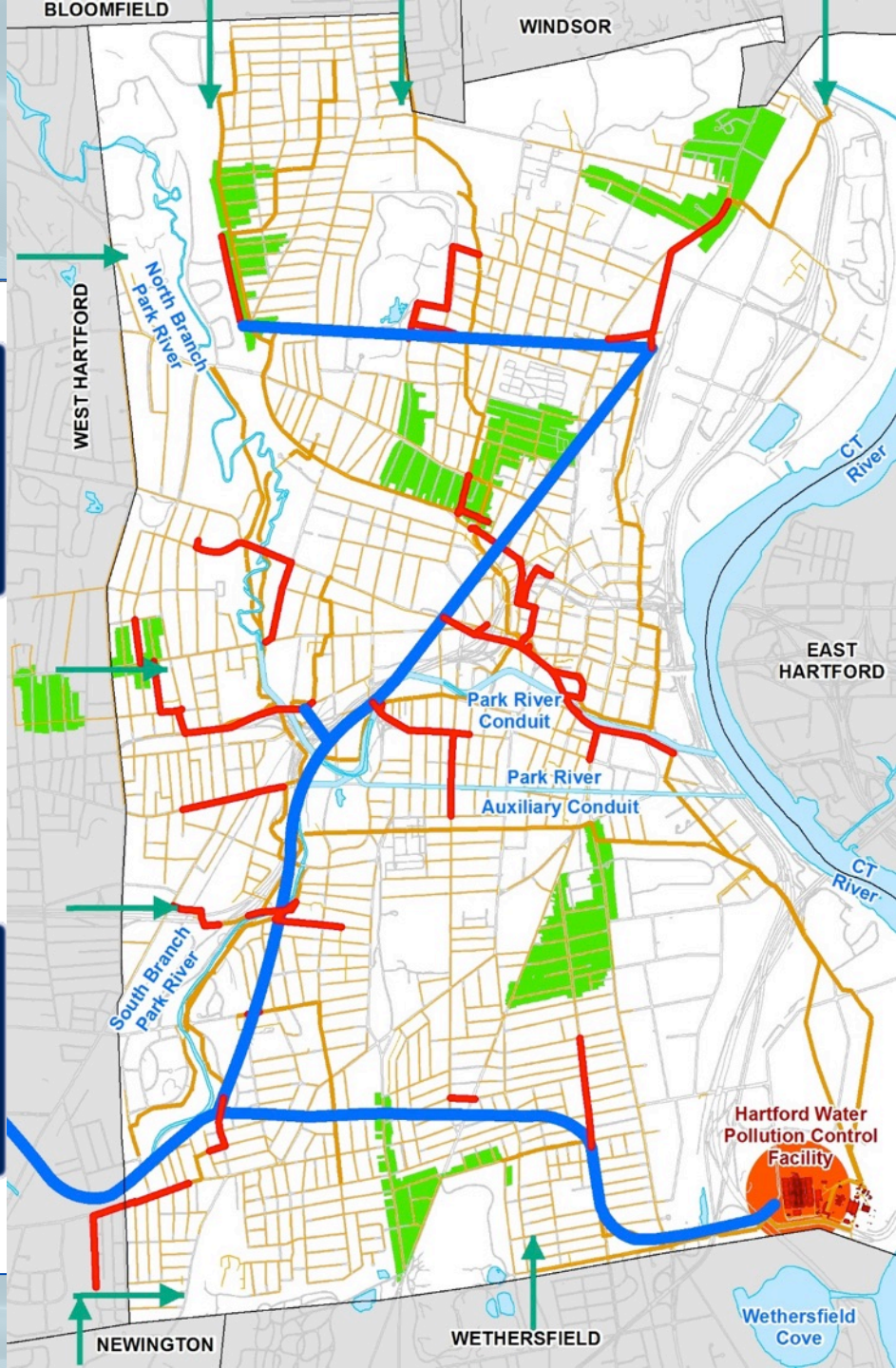
The Clean Water Project (CWP)

- The CWP is the MDC's Response to:
  1. ***Consent Order*** from CT DEEP to address combined sewer overflows
  2. ***Consent Decree*** from EPA to address sanitary sewer overflows
- Multiphase program in excess of $2B that will take a quarter century to complete
- Project Goals:
  1. Reduce the CSOs to streams/rivers
  2. Eliminate CSO outfalls to Wethersfield Cove & North Branch Park River
  3. Reduce Nitrogen discharged to CT River
  4. Address SSOs outside of Hartford

Clean Water Project
the choice is clear

Five Main Components of CWP

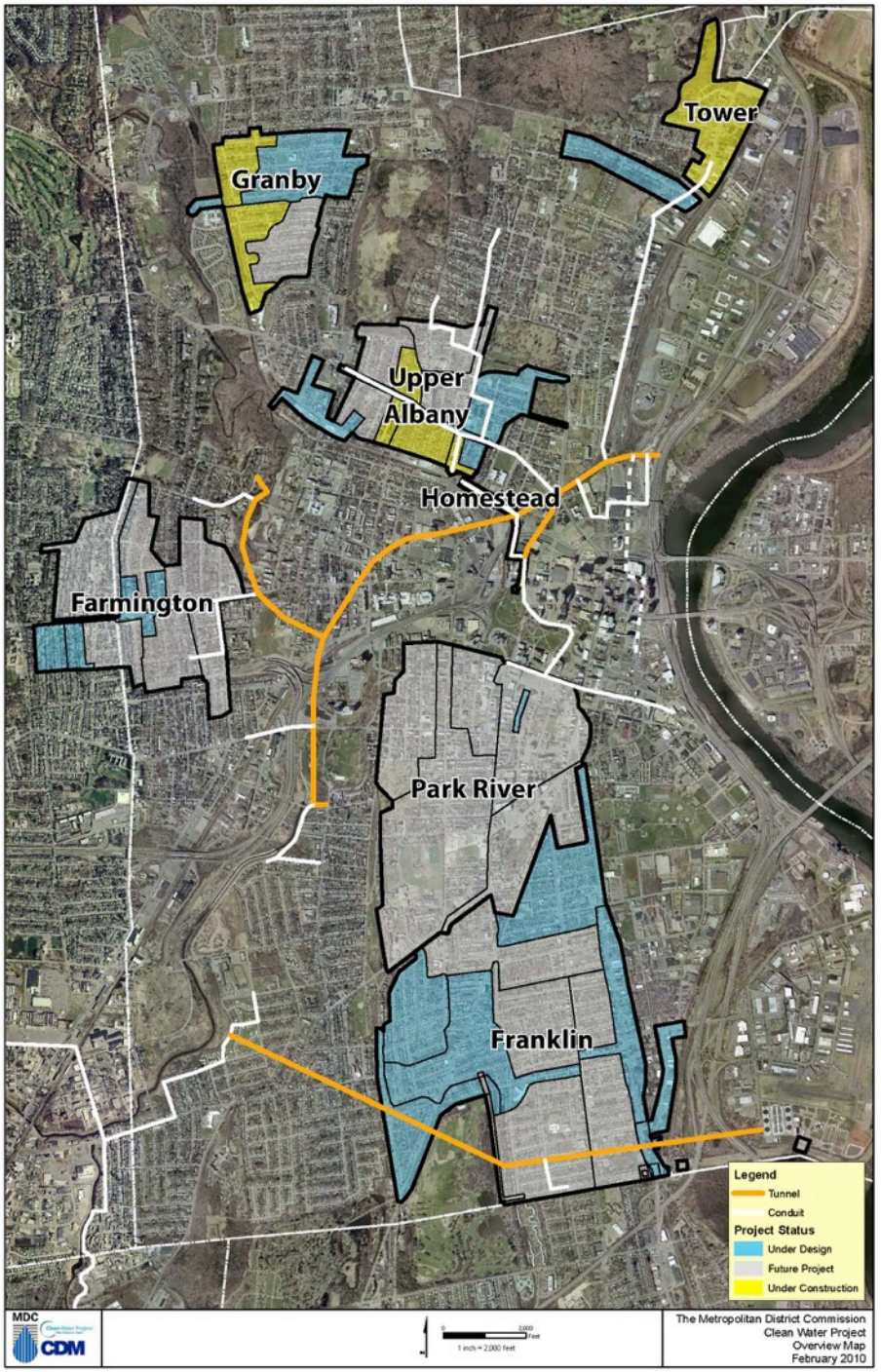
- Inflow & Infiltration Reduction
- Sewer Separation
- Treatment Plant Improvements
- Storage Tunnels
- Relief Interceptor Pipes



Gully Brook Conduit Sewer Connection Detection and Inspection Program

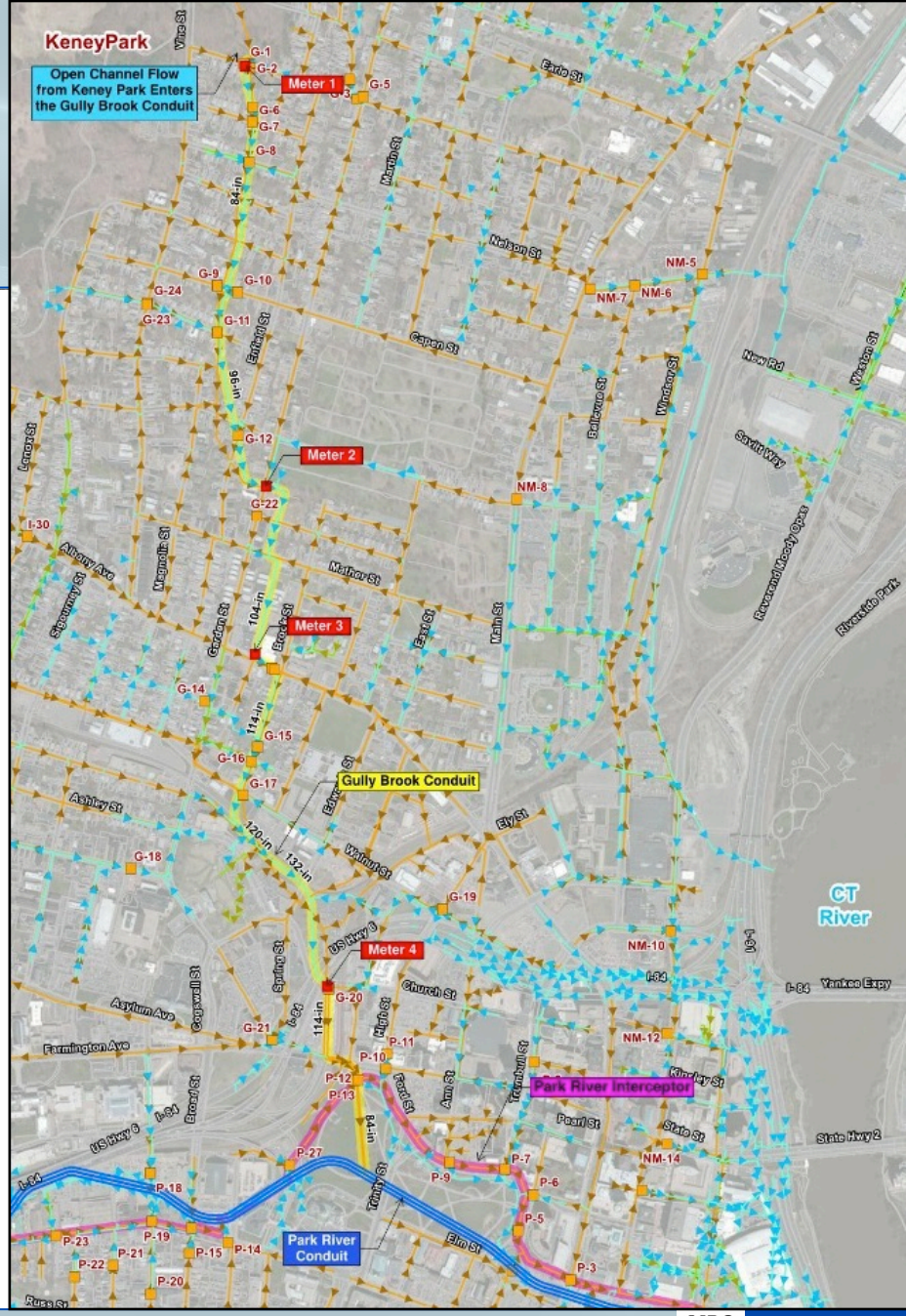
Sewer Separation Areas

- Original 2005 plan included 6 Areas throughout City
- In addition to CSO reduction, two original primary goals:
  1. Reduce sewer surcharging
  2. Eliminate the Gully Brook and Tower Brook from the combined sewer system



Gully Brook Conduit Background

- Conveys Gully Brook approximately three miles underground from Keney Park to Park River Conduit
- Ranges from 72-inch to 132-inch diameter
- Receives storm water and some sanitary flows from approximately 1,330 acre drainage area
- Construction in the area has included sewer separation



History of Typical Old Mill City with Brooks & Sewers

Hartford Daily Courant (1840-18
pg. 4

CORPORATION NOTICES.

ASSESSMENT

FOR RIGHT OF WAY FOR

GULLY BROOK SEWER.

STREET DEPARTMENT,
CITY OF HARTFORD.

THE Board of Street Commissioners of the city of Hartford, acting as a court for the assessment of betterments and appraisement of damages, pursuant to the provisions of section 8, chap. 76, being "An act amending the charter of the city of Hartford," passed May session, A. D. 1850, and approved July 8, 1853, and in compliance with the ordinances of said city, having given due and legal public notice of the time and place of meeting for the purpose of appraising the damages and assessing the betterments caused by the laying out of a public sewer, from Edwards street westerly and northerly through private lands to Liberty street, and from thence northerly through Brook street to Albany avenue, that portion of the same passing through private lands, being described as follows: Commencing at the west end of the Edwards street culvert, and thence running westerly, curving to the right with a radius of 601 feet for a distance of 302 feet, thence westerly curving to the left with a radius of 297 feet for a distance of 131 feet, thence westerly and southerly curving to the right with a radius of 601 feet for a distance of 341 feet, thence northerly in a line tangent to the last described curve for a distance of 220 feet; running through lands now or formerly owned or occupied by Charles Collins, Robert Travis, Connecticut Western railroad company, Saunders & Hartshorn and Nathan Stackweather, met at the office of the board in said city on the 18th day of July, A. D., 1877, at 7½ o'clock p. m., the time and place designated in said notice, and by adjournment from time to time did on the 31st day of October, 1877, at the same place, having viewed the premises and heard all the parties present and interested, did make the following appraisement and award of damages as according to the several parties by the laying out of said sewer, including the right to build and maintain the same through their respective properties, and assessed the benefits upon the same persons who, shall hereafter be found to be benefited by the construction of said sewer, and in the same proportion:—

Charles Collins	$ 192 50
Connecticut Western railroad company	308 00
George E. Hartshorn	70 00
Nathan Stackweather	55 00
	$625 50

And we find no damage to any other persons or party, loss or property.

JOHN C. PARSONS, }
FRED'K S. BROWN, }
W. H. BULKELEY, } Board of Street Commissioners
E. K. HUNT, } Acting as a Court Aforesaid.
JAMES BURNS, }

City of Hartford, October 31st, 1877.

CITY OF HARTFORD,
CITY CLERK'S OFFICE, Nov. 1st, 1877.

A true copy as on file in said office.

Attest: JOHN E. HIGGINS, City Clerk.

Gully Brook Sewer.

CITY OF HARTFORD.

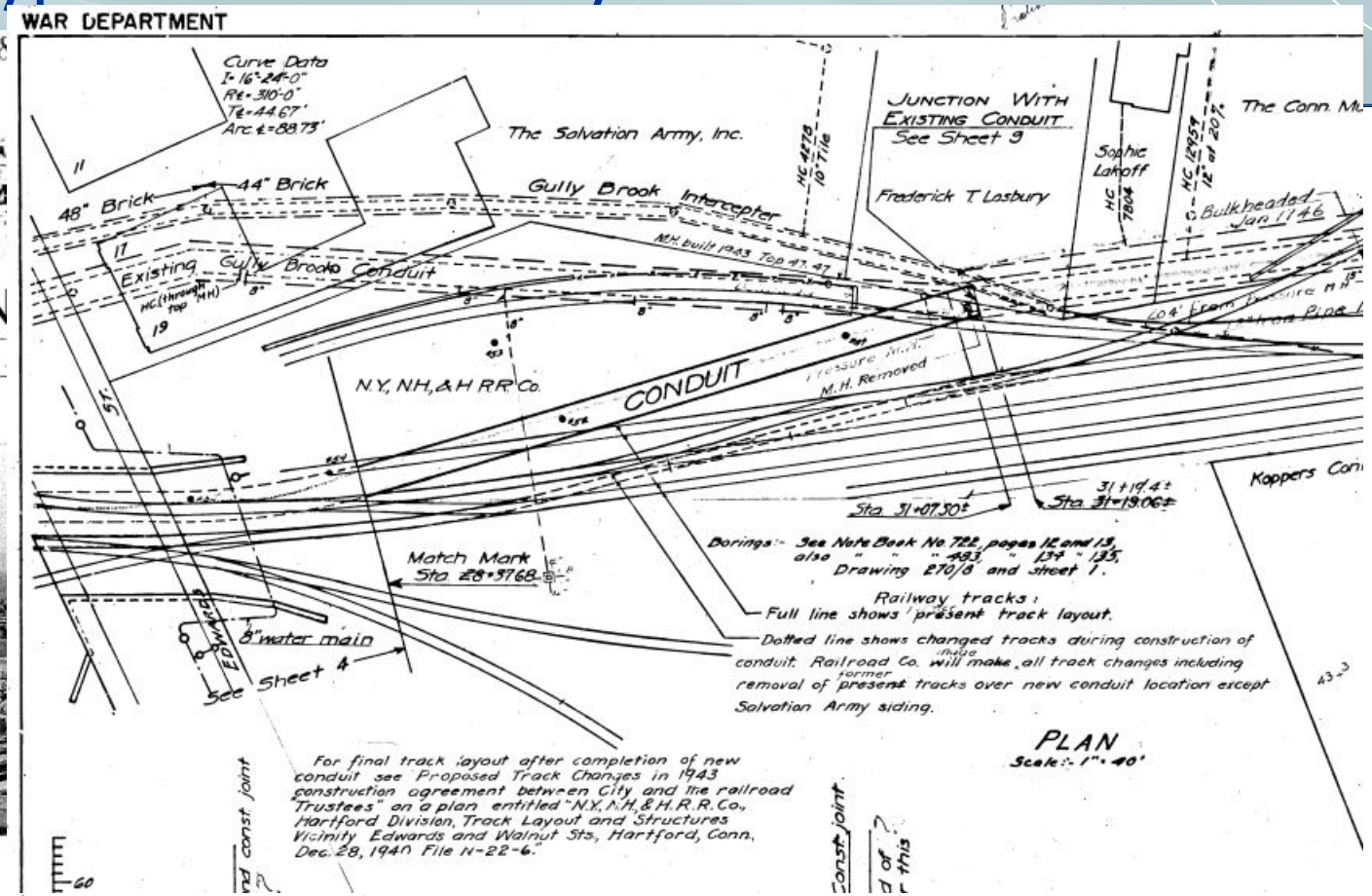
THE Board of Street Commissioners have made the following schedule of proposed

MISCELLANEOUS A

HOLM

Ague and

N



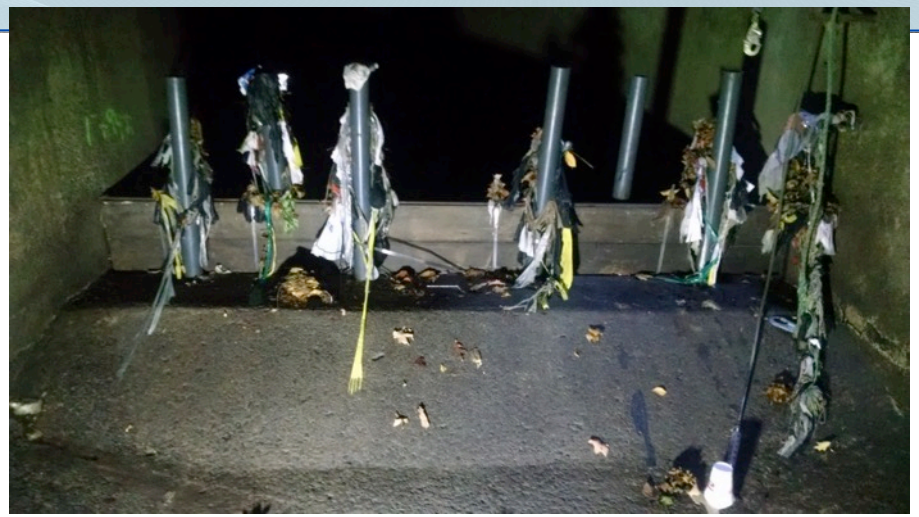
Metropolitan District Sewage Plant at Hartford

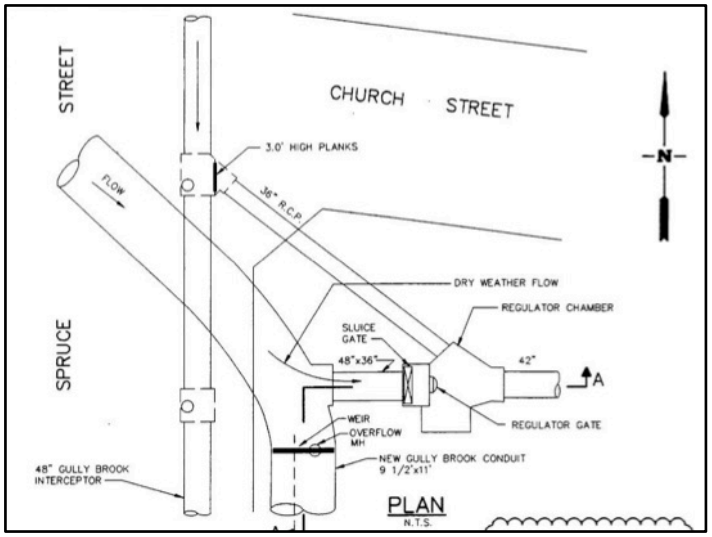
By WILLIAM A. D. WURTS
Assistant City Engineer, Hartford

THE sewage treatment plant of the Metropolitan District of Hartford is nearing completion and will be in operation early in 1938. The plant

probably take this time to flow through the tank. Flow through the tanks is continuous and not on the "fill and

Gully Brook Conduit Background (Cont.)





G-20 CSO Regulator

- Directs dry weather flow to the combined system
- Wet weather overflow discharges to Park River Conduit and ultimately Connecticut River
- Largest CSO regulator representing about 15% of CSO discharge
- Contributes about 750 MG of brook flow annually

Gully Brook Separation

- 5 separation and relief sewer projects
- $93M and over 10 years to complete

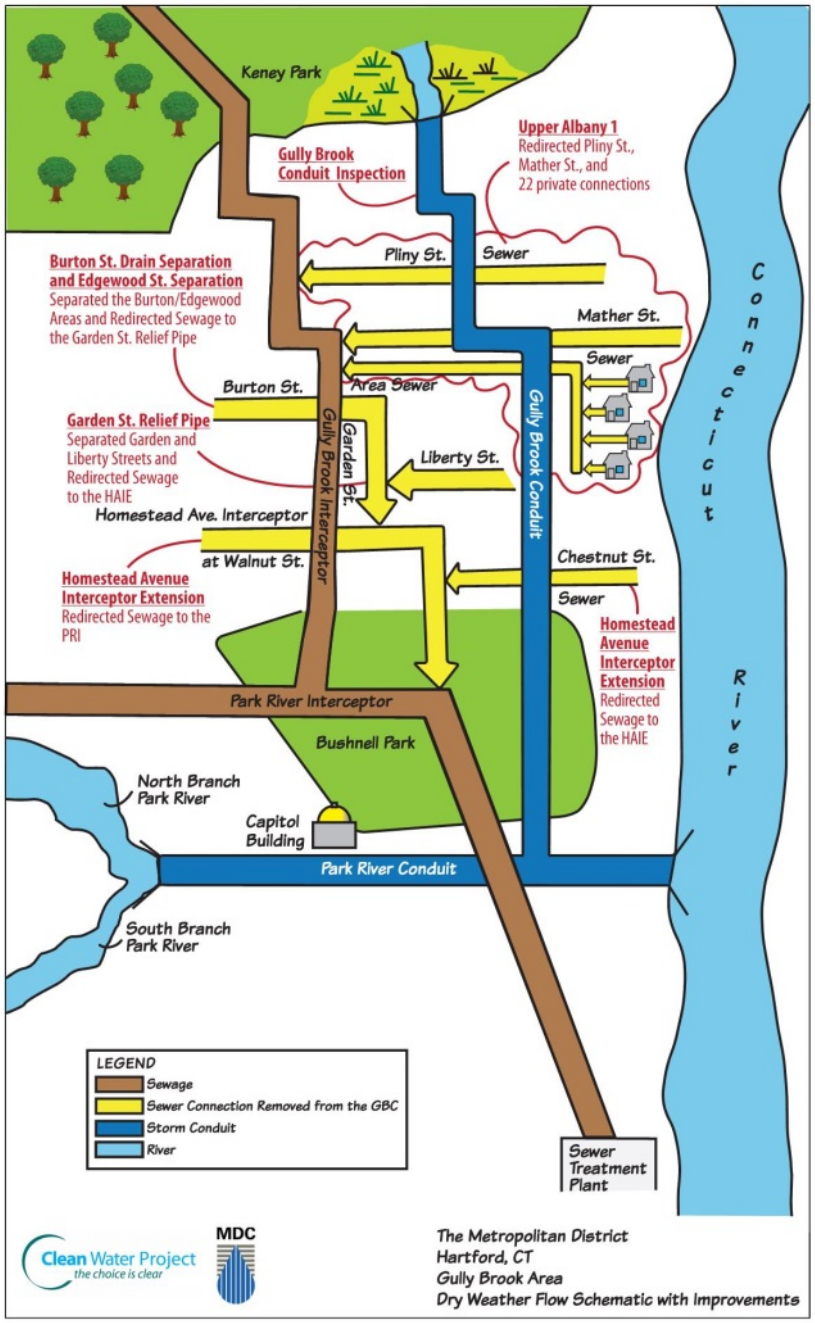


Figure 2

Gully Brook Conduit Sewer Connection Detection and Inspection Program

Goals

- Identify unknown sewer connections
- Remove all sewer connections from both direct connections and tributary drains
- Connect sanitary sewers to adjacent sewers
- Remove Gully Brook from the combined system

Approach

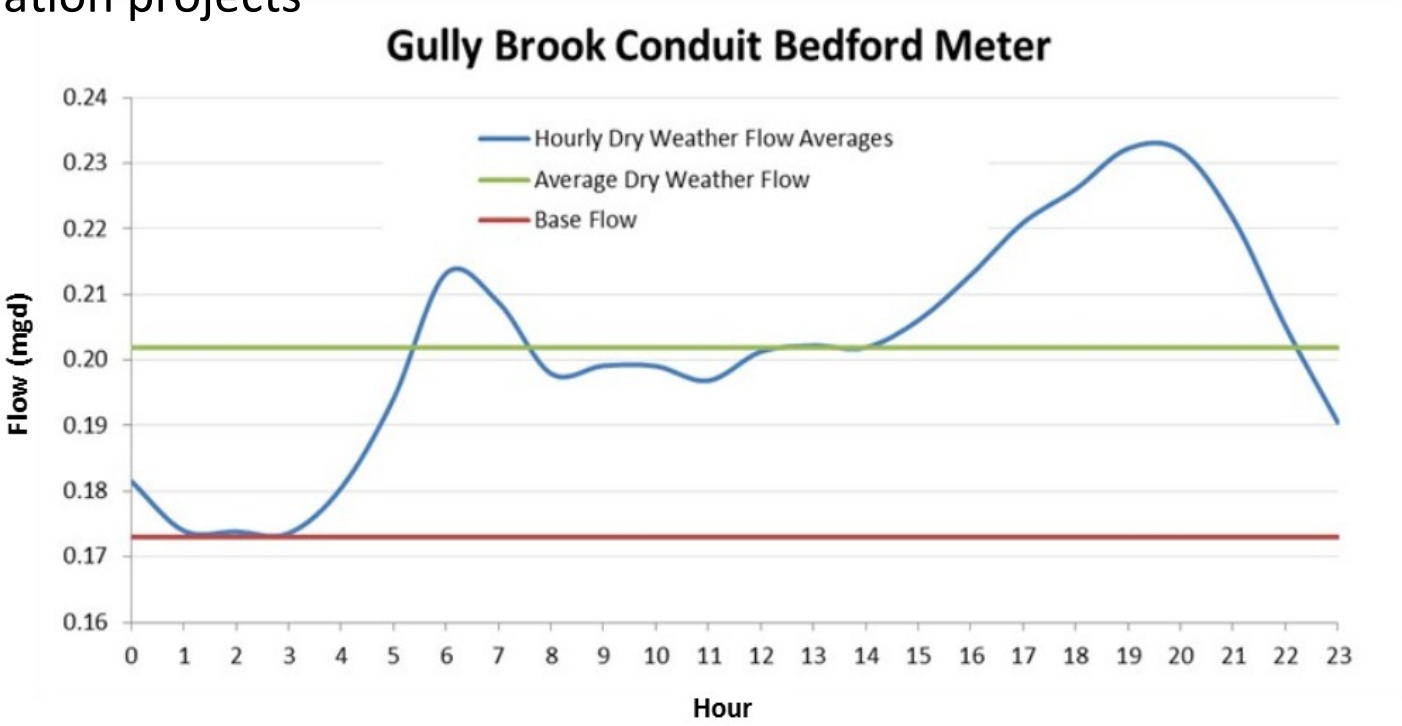
<u>Illicit Sanitary Connection Investigation</u>

- Flow Meter Program
- Gather Data
- Visual Inspection
- CCTV Inspection Program
- Dye Testing Program
- Recommendations
- Results

Illicit Sanitary Connection Investigation (Cont.)

Flow Meters

- Four meters installed (upstream, downstream and two intermediate points)
- 55,000 gpd of total sewage identified taking into account on-going sewer separation projects



Illicit Sanitary Connection Investigation

Gather Data

- Record Drawings
- GIS Data
- Sewer and Drain Plots
- Design Drawings
- As-builts
- Tie Cards

Illicit Sanitary Connection Investigation (Cont.)

<u>Dry Weather, Visual Inspection</u>

- Six person crew including three person inspection team (CDM Smith and Flow Assessment Services)
- Inspections preceded by >48-hrs of dry weather
- Identify, photograph and characterize all pipe connections

Illicit Sanitary Connection Investigation (Cont.)

<u>Dry Weather, Visual Inspection</u>

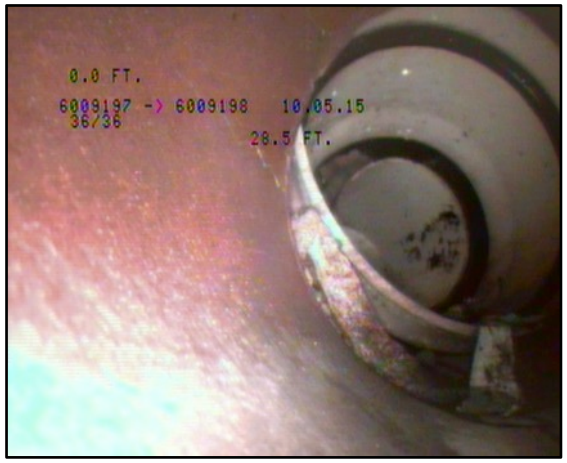
- Sample dry weather flow
- Sandbag and re-inspect dry connections
- Connections with visible sanitary flow not sampled

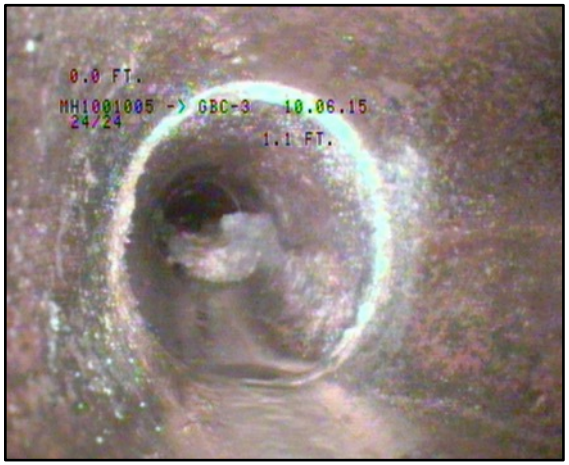
Illicit Sanitary Connection Investigation (Cont.)

Dry Weather, Visual Inspection

- 262 total connections
- 111 connections sandbagged
- 32 samples
- 14 connections identified for further investigation

Illicit Sanitary Connection Investigation (Cont.)





<u>IDDE and CCTV Inspections</u>

- Illicit Discharge and Detection Elimination (IDDE) inspection completed on sideline pipes and structures
- CCTV inspection of: 8,210 LF drain pipe, 2,825 LF of sewer pipe, and drain & sewer laterals

Illicit Sanitary Connection Investigation (Cont.)

Regulator Inspection Results

- Visual inspection of regulator structures
- No sewer flow in drain pipes
- Two sewer service connections discharging to overflow side of CSO Regulator G-10

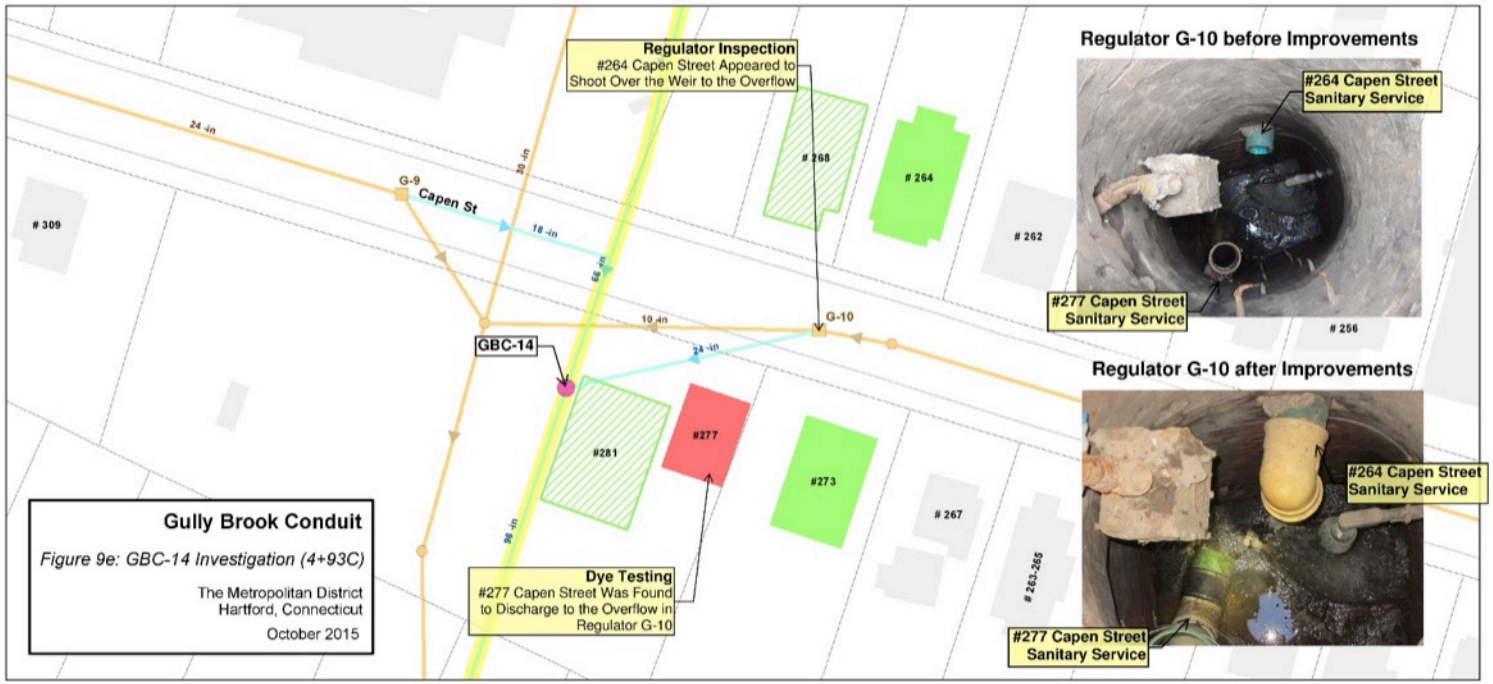
Illicit Sanitary Connection Investigation (Cont.)

Dye Testing Program

- 116 buildings targeted
- 108 buildings dye tested
- Five illicit sewer connections:
  - GBC – 20
  - GBC – 14
  - GBC – 11
  - GBC – 35
  - GBC – 26

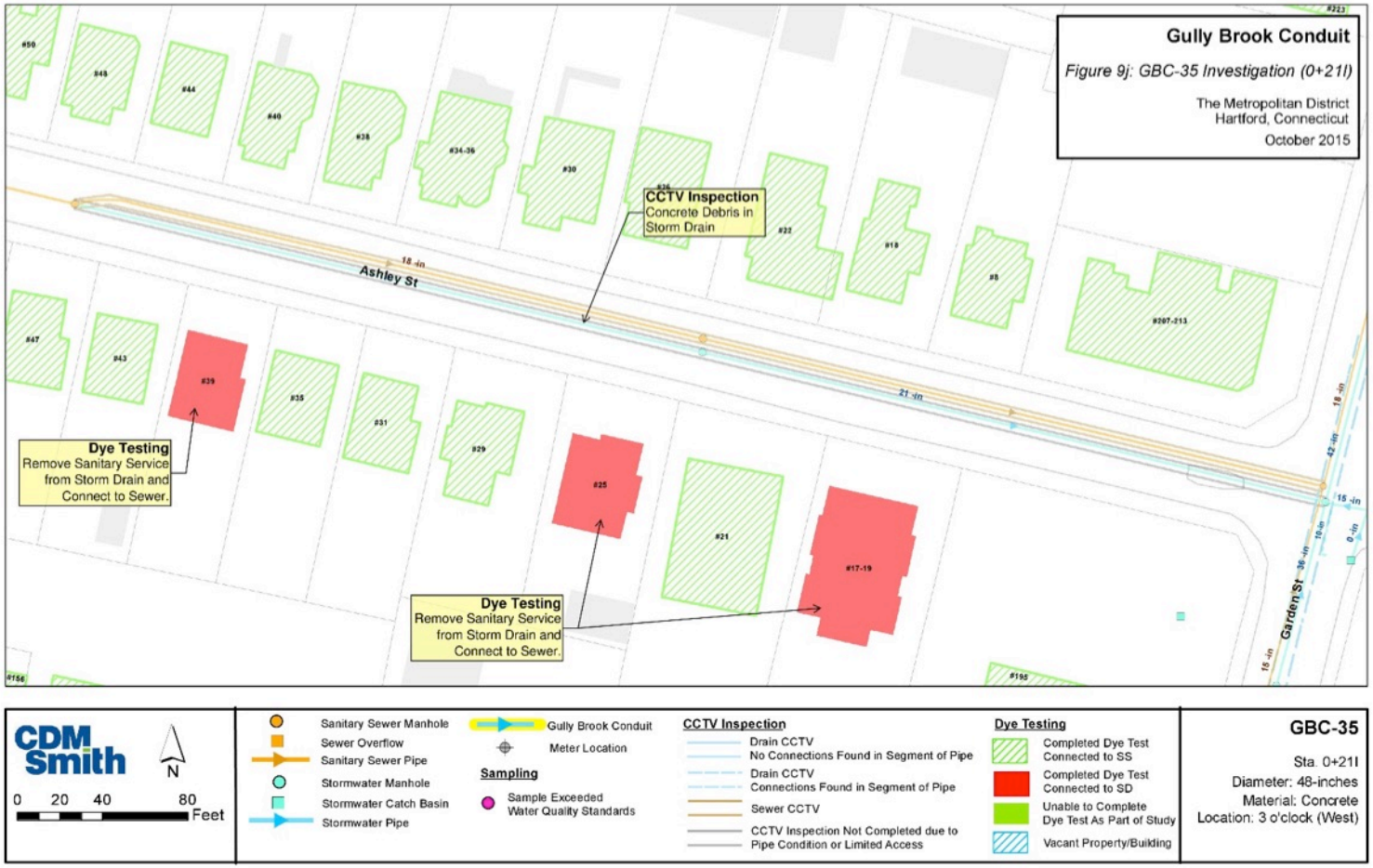
Recommendations (Cont.)

GBC-14 - Adjust two sewer services in Regulator G-10 to discharge on sewer side



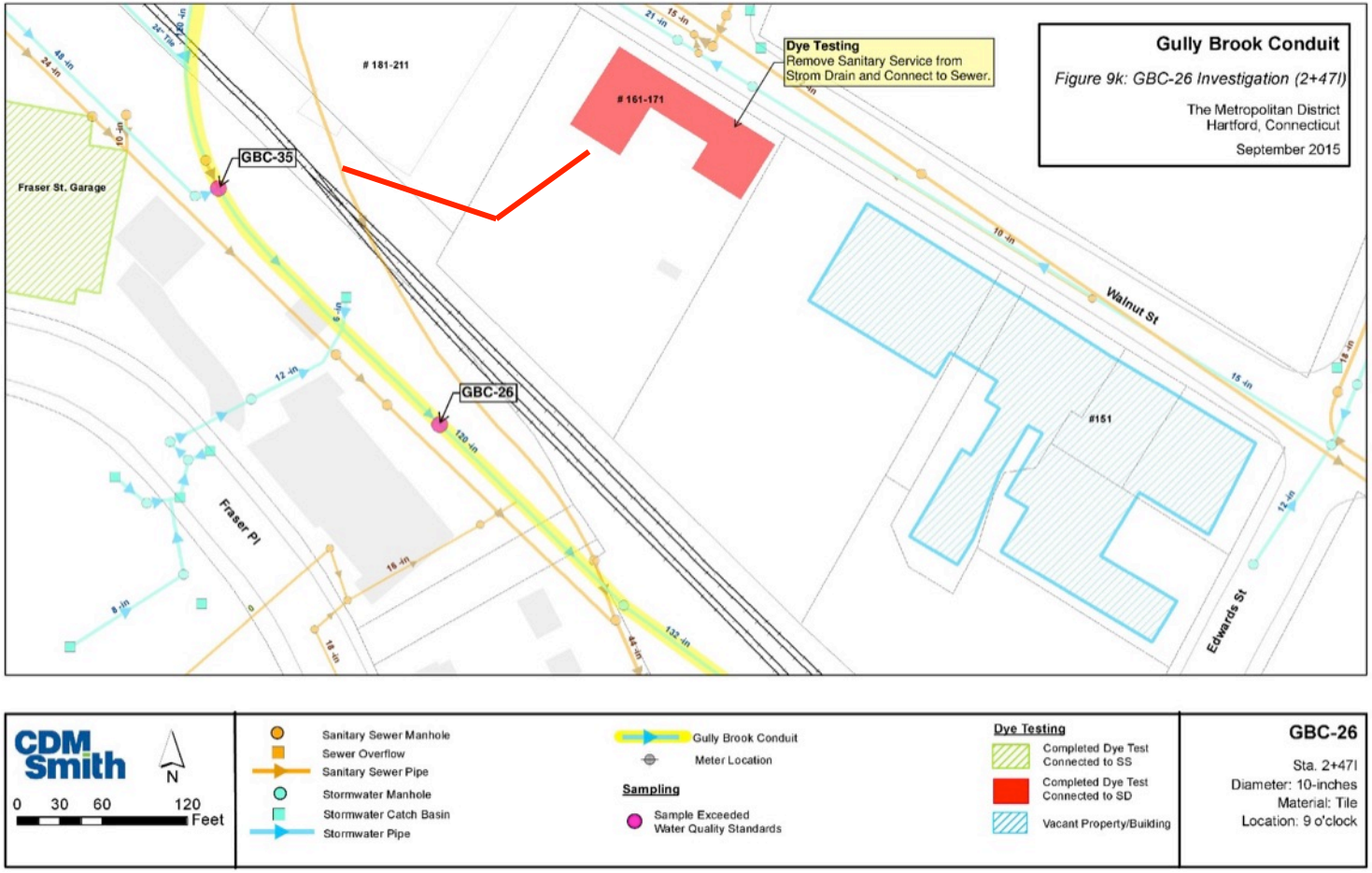
Recommendations (Cont.)

GBC-35 - Drain improvements and disconnect three sewer services from drain



Recommendations (Cont.)

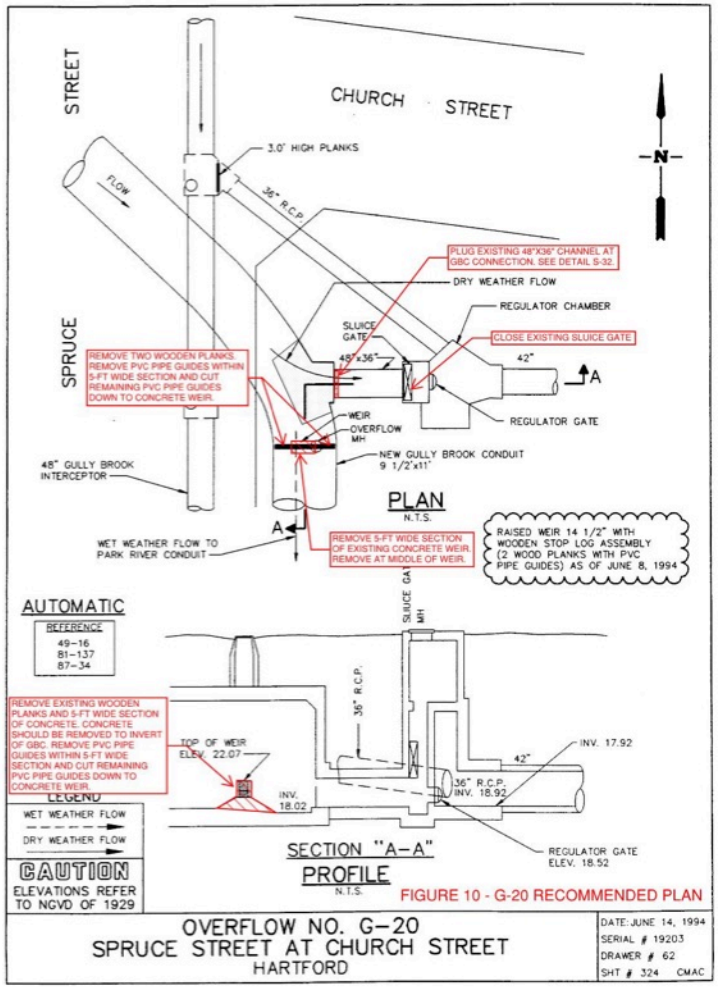
GBC-26 - Disconnect one sewer service from drain



Recommendations (Cont.)

Remove Connection to Sewer System at CSO Regulator G-20

- Close existing sluice gate
- Plug connection point
- Remove portion of weir



Summary of Results

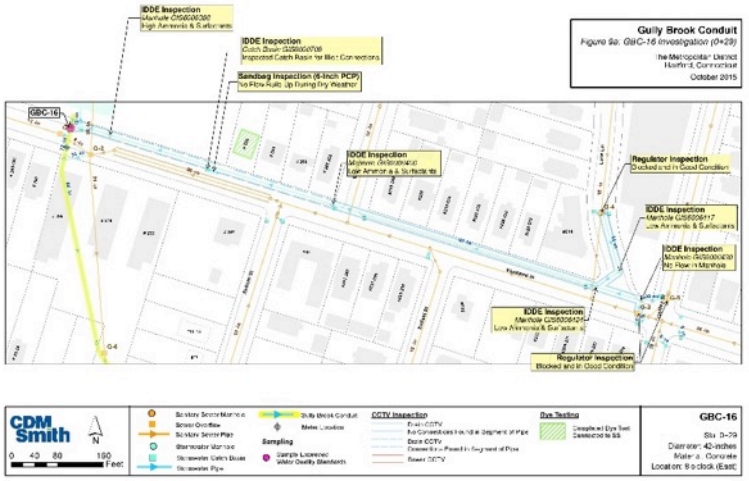
- Fall 2014 – Visual Pipe Inspection
- Winter/Spring 2015 – CCTV
- Spring/Summer 2015 – Dye Testing
- Summer/Fall 2015 – Recommendations
- All recommendations were completed by MDC last week
- Adjustments to CSO Regulator G-20 expected to be completed by MDC next week

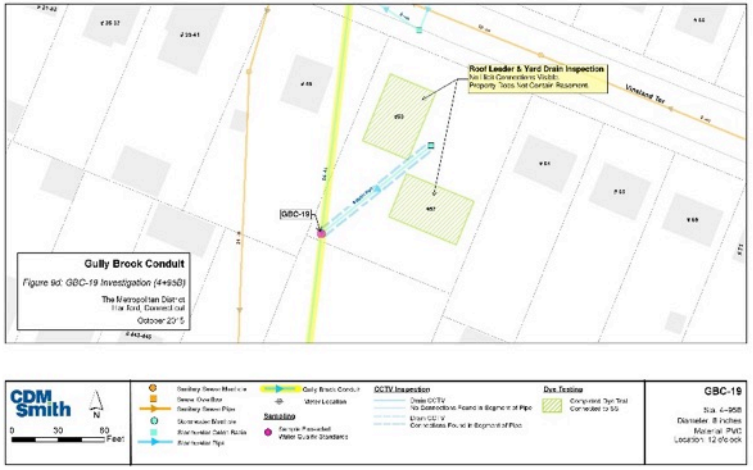
Questions

Recommendations

Five Illicit Connections:

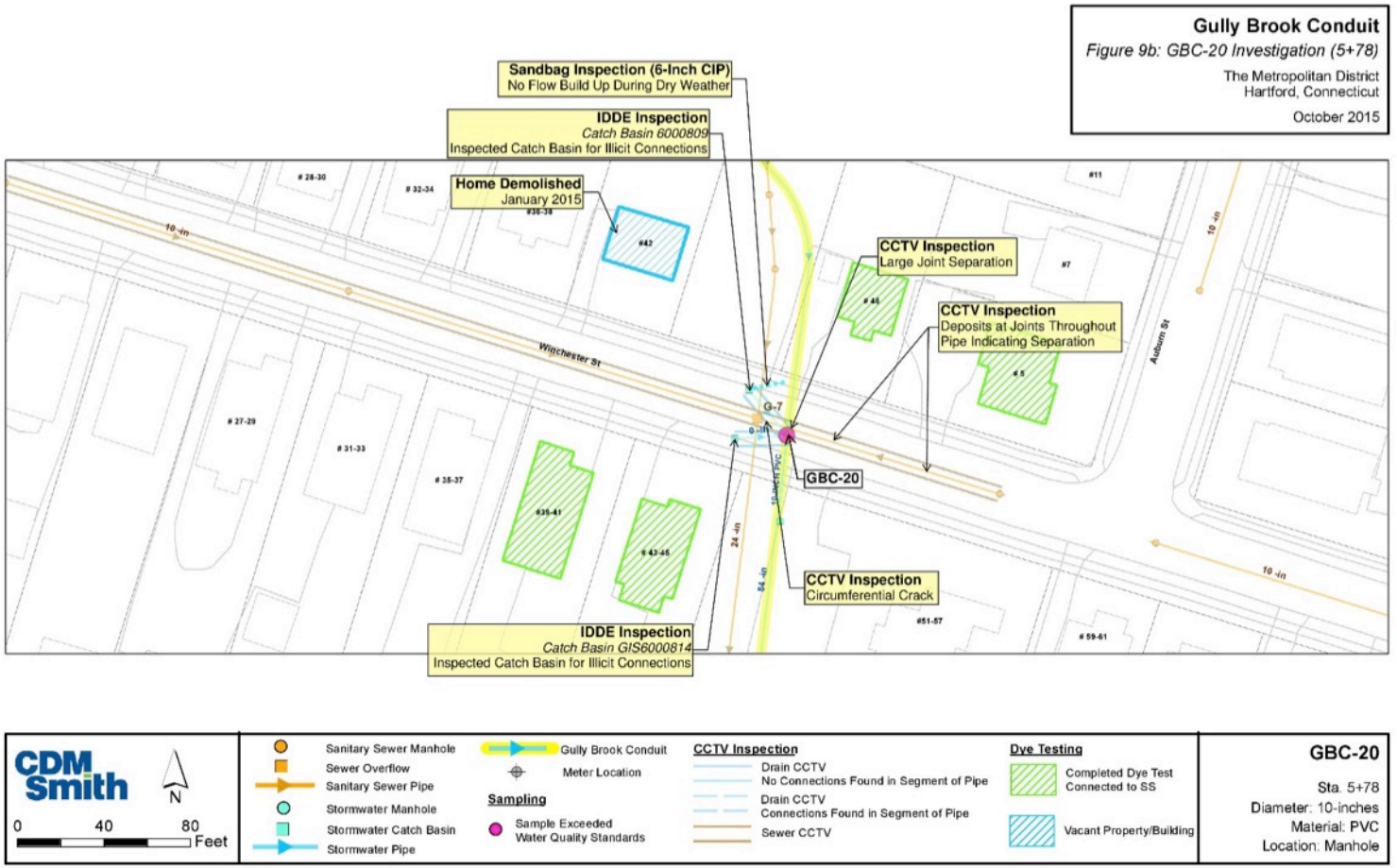
- GBC-16
- GBC-19
- GBC-25
- GBC-13
- Liberty Street Connection





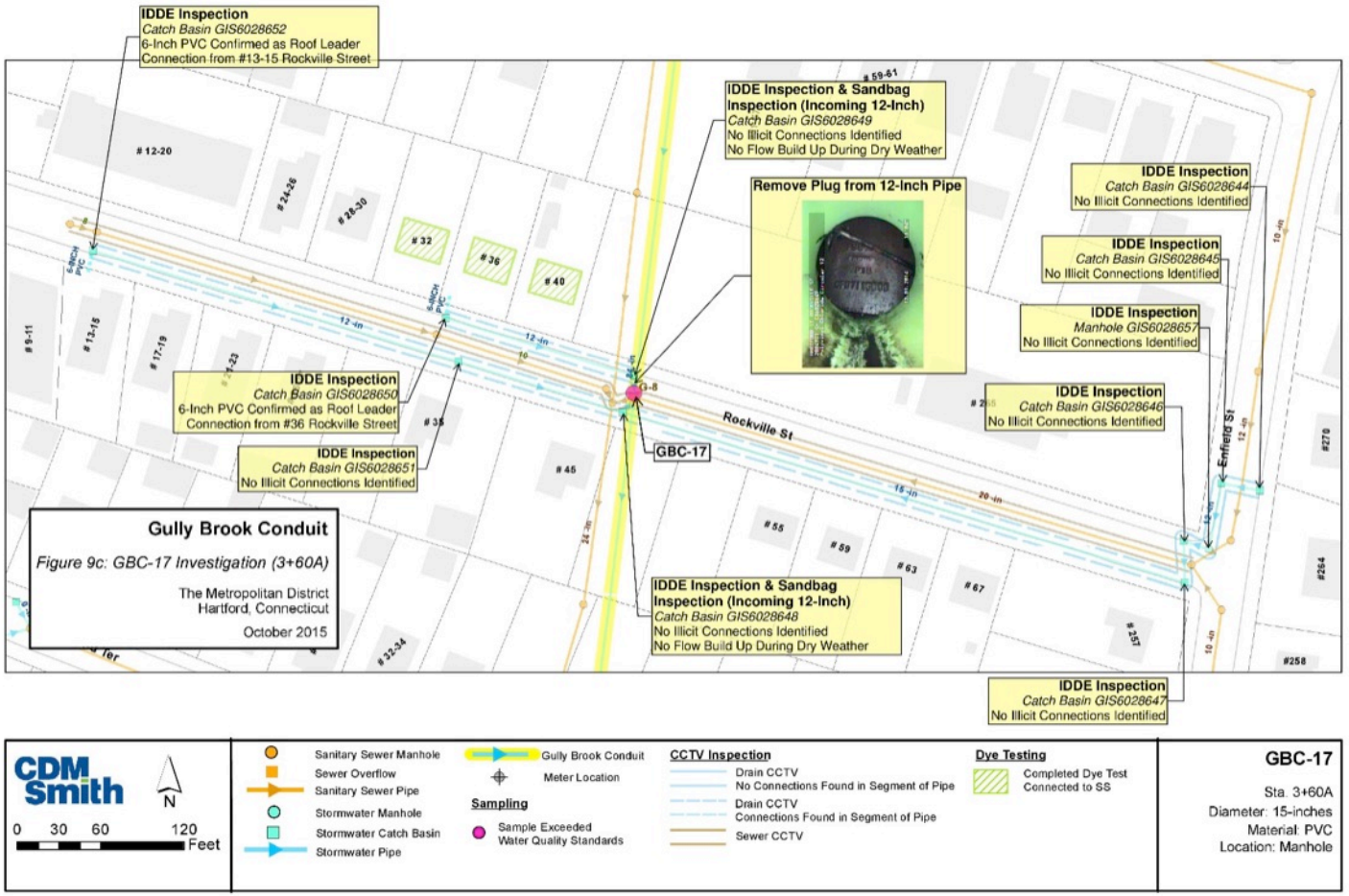
Recommendations (Cont.)

GBC-20 - Cured-in-place-pipe (CIPP) line adjacent sewer to prevent exfiltration



Recommendations (Cont.)

GBC-17 – Drain improvements



Recommendations (Cont.)

GBC-11 - CIPP two sewer services to prevent exfiltration