CITY OF PLAINFIELD
UNION County, New Jersey
Flood INVESTIGATION
NOVEMBER 10, 2015

Presented by:

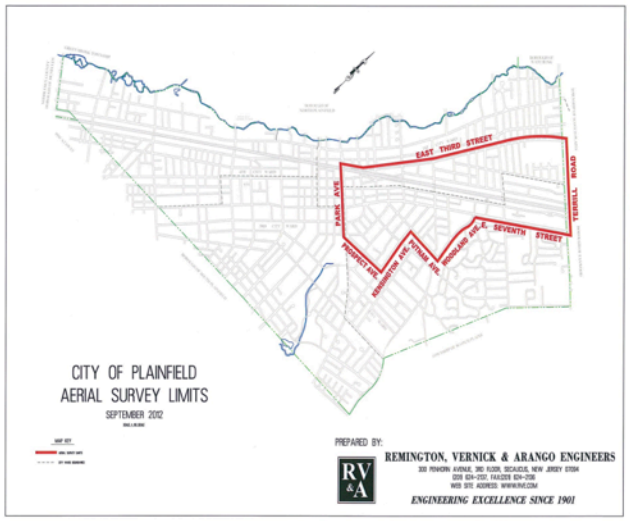
HATCH MOTT MACDONALD

- Kevin Nollstadt, PE, CFM
- Leo Coakley, PE, PP

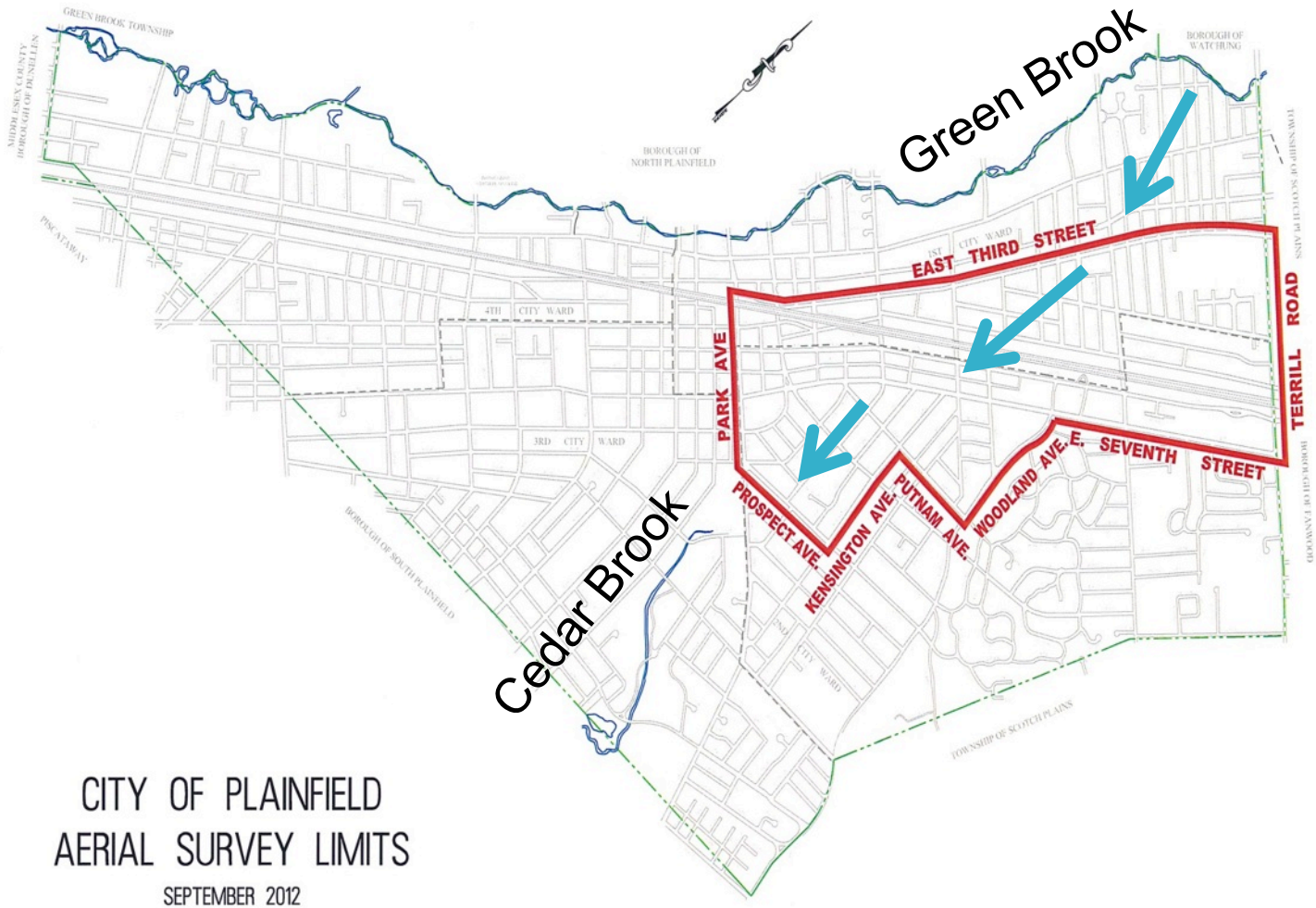
INTRODUCTION

- Purpose:
  - Review and investigate the FEMA Flood Insurance Study (FIS) in a portion of the City subject to overflow from the Green Brook.

INTRODUCTION



- Project Area Location
  - Terrill Road (to north),
  - Park Avenue (to south),
  - East Third Street (to west) and
  - E. Seventh Street, Woodland Ave., Putnam Ave., Kensington Ave. (to east) towards Prospect Ave.



CITY OF PLAINFIELD
AERIAL SURVEY LIMITS

SEPTEMBER 2012

SCALE = NO SCALE

MAP KEY

AERIAL SURVEY LIMITS

CITY WARD BOUNDARIES

PREPARED BY:

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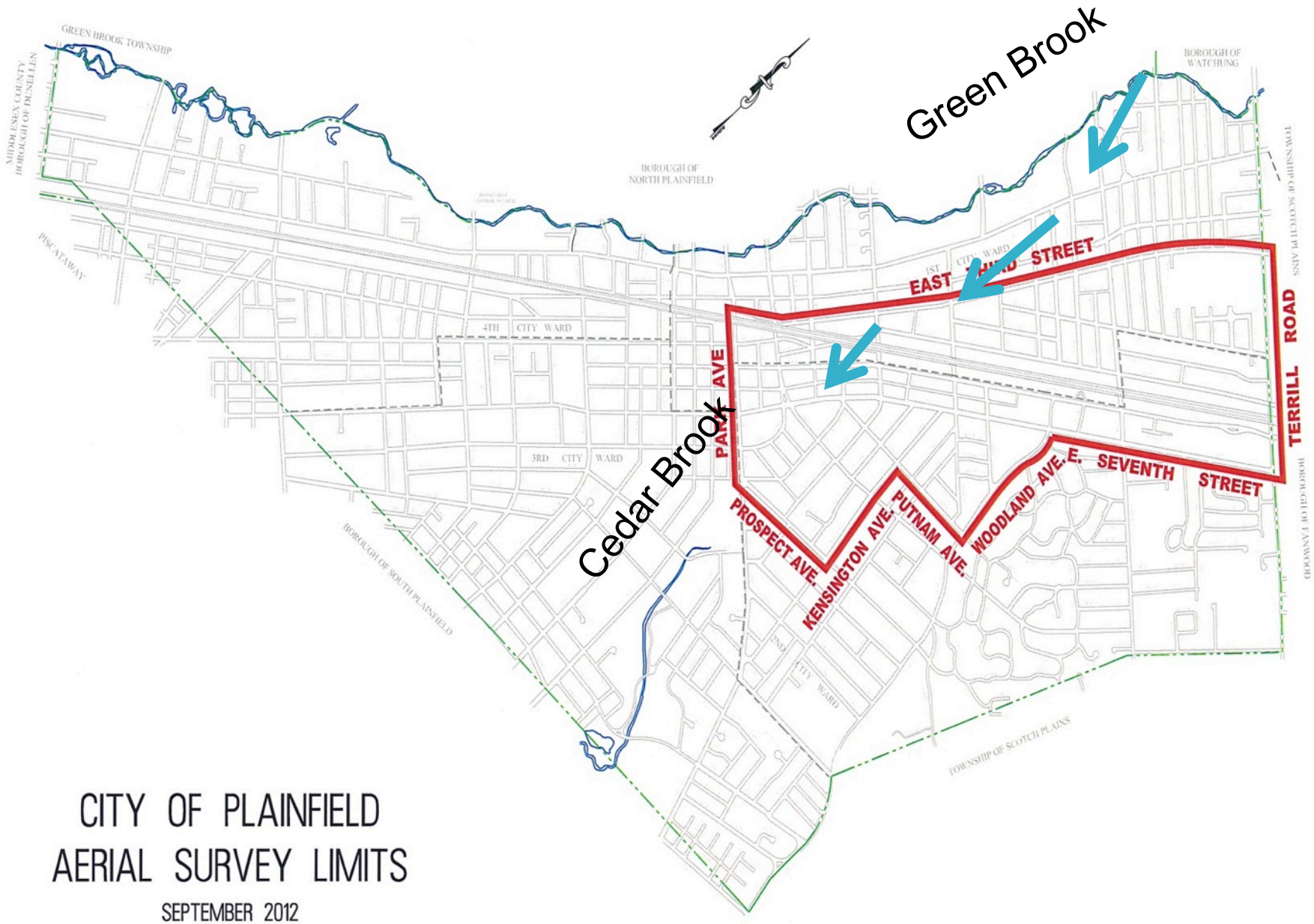
INTRODUCTION

- The project area is hydraulically complex.

- Overflow from Green Brook
  - passes through as sheet flow,
  - through openings under the railroad embankment,
  - then enters upper reach of Cedar Brook near Park Avenue.



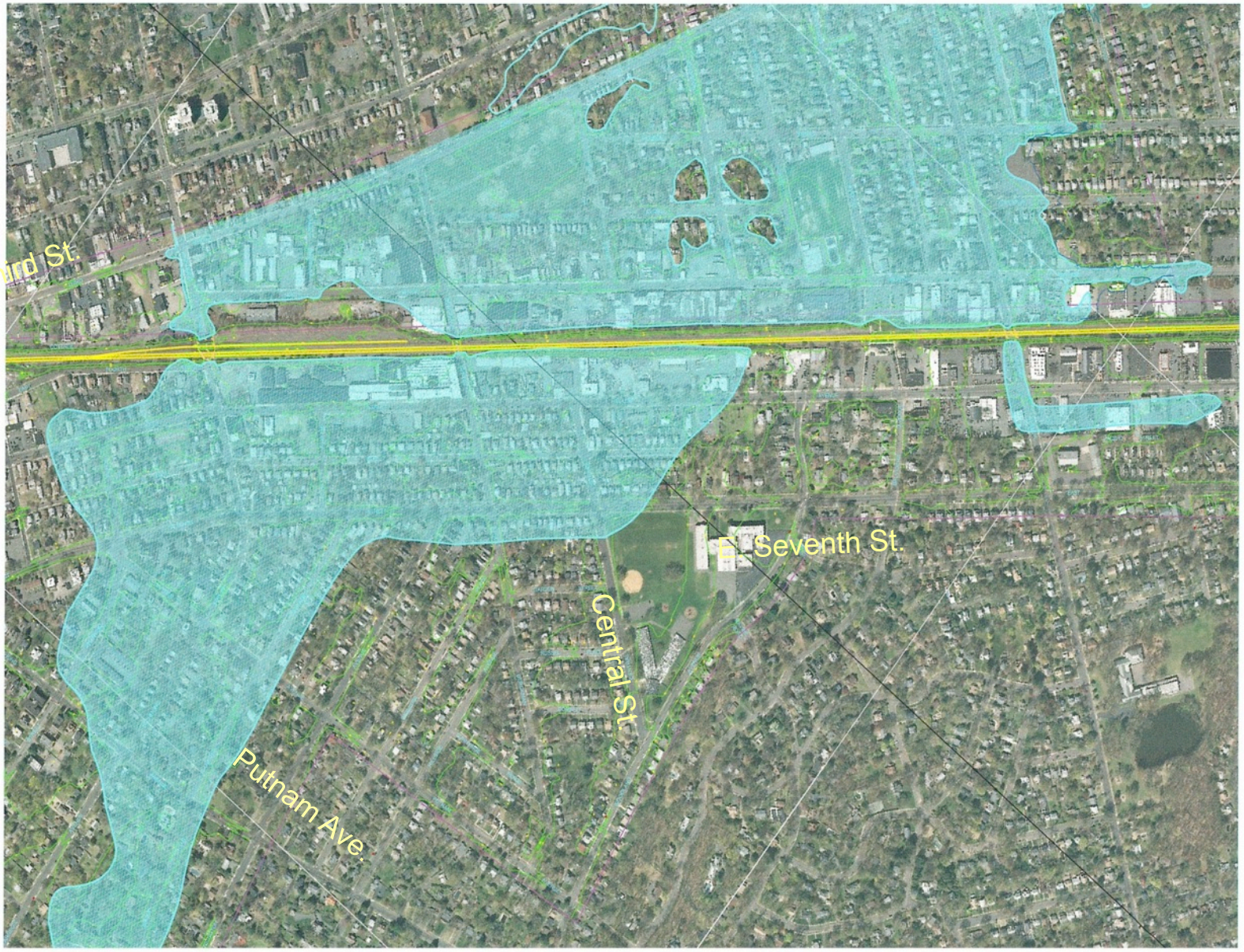
CITY OF PLAINFIELD
AERIAL SURVEY LIMITS

SEPTEMBER 2012

SCALE = NO SCALE

INTRODUCTION

- Limits of flooding – delineated on FEMA Flood Insurance Rate Map (FIRM)
- Area inundated by the 1% annual chance flood:
  - Commonly known as the 100-year flood
  - Also know as the “base flood”.


E. Third St.
E. Seventh St.
Central St.
Putnam Ave.

COMPARISON OF PEAK FLOWS ON GREEN BROOK

Gage Location on Green Brook	Drainage Area (Sq. Mi.)	Date	Peak Discharge (cfs)	Comments
Green Brook at Seeley Mills (01403400) Upstream of Project Site	6.23	Aug. 2, 1973	6,240	Historic Peak of Record
	River	Overflows	Banks	
Green Brook at Plainfield (01403500) Sycamore Ave Just Downstream Of Project Site	9.75	Aug. 2, 1973	2,080	
Green Brook at Rock Ave (01403600) Downstream of Project Site	18.2	Aug. 2, 1973	10,400	Historic Peak of Record

- Flood of record in 1973
- Peak flow 6,240 cfs at Seeley Mills
- Flow reduced to 2,080 cfs at Sycamore Ave.
- Reduced flows downstream of the project area due to overflow from Green Brook.
- Higher flows further downstream due to larger area (18.2 sq.mi.).

COMPARISON OF PEAK FLOWS ON GREEN BROOK

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		Sept. 16, 1999	4,090	Hurricane Floyd
		Aug. 28, 2011	2,440	Hurricane Irene
		N/A	3,370	FEMA 100-yr flow
		N/A	4,213	NJDEP Flow
	River	Overflows	Banks	

- Flood of record in 1973 was greater than the estimated 100-year peak flow.
- Hurricane Floyd (1999) peak is between FEMA and NJDEP estimates of 100-year flow.
- Hurricane Irene (2011) was less than the estimated100-year flow.

COMPARISON OF PEAK FLOWS ON GREEN BROOK

Gage Location on Green Brook	Drainage Area (Sq. Mi.)	Date	Peak Discharge (cfs)	Comments
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		Aug. 28, 2011	2,440	Hurricane Irene
		N/A	3,370	FEMA 100-yr flow
		N/A	4,213	NJDEP Flow
	River Overflows Banks			
Green Brook at Plainfield (01403500) Sycamore Ave Just Downstream Of Project Site	9.75	Aug. 2, 1973	2,080	
		Sept. 16, 1999	2,590	Hurricane Floyd
		Aug. 28, 2011	2,410	Hurricane Irene
		N/A	2,100	FEMA 100-yr flow
		N/A	2,625	NJDEP Flow

- Comparison of flows indicates:
- Very high overflow in 1973:
  - 6,240 cfs drops to 2,080 cfs
- Significant overflow in Floyd (1999).
  - 4,090 cfs drops to 2,590 cfs
- Less overflow in Irene (2011).
  - 2,440 cfs drops to 2,410 cfs

COMPARISON OF PEAK FLOWS ON GREEN BROOK

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		Sept. 16, 1999	2,590	Hurricane Floyd
		Aug. 28, 2011	2,410	Hurricane Irene
		N/A	2,100	FEMA 100-yr flow
		N/A	2,625	NJDEP Flow
Green Brook at Rock Ave (01403600) Downstream of Project Site	18.2	Aug. 2, 1973	10,400	Historic Peak of Record
		Sept. 16, 1999	7,460	Hurricane Floyd
		Aug. 28, 2011	5,170	Hurricane Irene
		N/A	7,900	FEMA 100-yr flow
		N/A	9,875	NJDEP Flow

- Flood of record in 1973 was 6,240 cfs which is greater than the estimated 100-year peak flow.
- Hurricane Irene and Hurricane Floyd are less than the estimated100-flow.
- Reduced flows downstream of the project area confirm that Green Brook overtops its banks.

REVIEW OF FEMA MAPS

- HMM consulted with State and Federal agencies:
- NJ Department of Environmental Protection (NJDEP)
- Federal Emergency Management Agency (FEMA)
- US Army Corps of Engineers (ACOE).

REVIEW OF FEMA MAPS

- US Army Corps of Engineers (ACOE).
- Currently undertaking investigations of the Green Brook
- Currently studying overflow and sheet flow through Plainfield to Cedar Brook using improved 2D modeling technology.
- Modeling results expected by summer 2016. Can be made available to Plainfield.

REVIEW OF FEMA MAPS

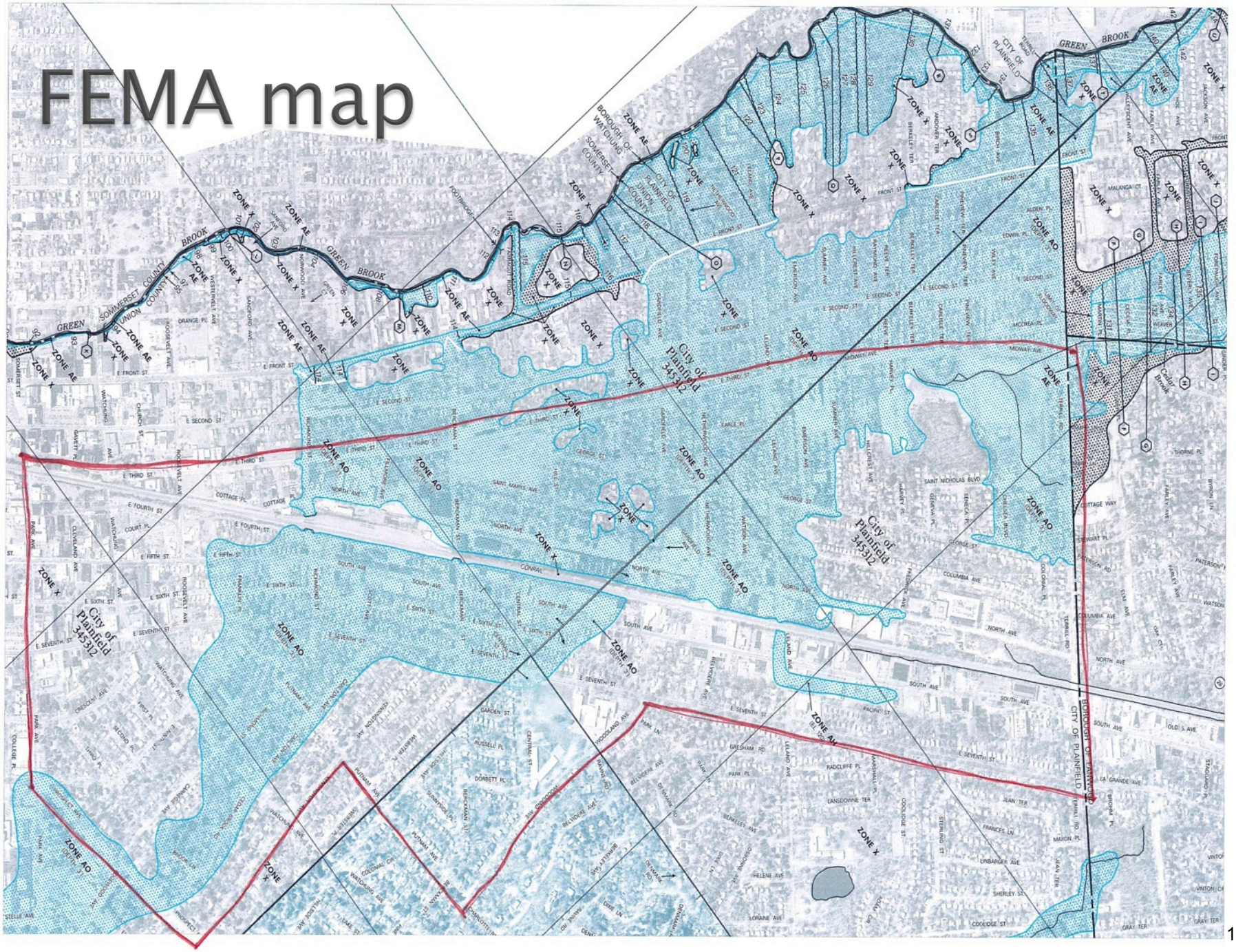
- Current FEMA Study and Maps – dated September 20, 2006.
- Flood limits were not re-studied since the previous study dated 1983.
- The last time this area was studied was in the 1970s
- No backup data was available to verify the overland flow limits and depths.
- NJDEP indicated that the delineations are estimated based on historic flood marks.

REVIEW OF FEMA MAPS

- Current (2006) FEMA Maps:
- Show most of the flood plain through the project area to be Zone AO with a depth of 3 feet.
- Zone AO is defined as: “Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined.”

- Small area on South Avenue designated Zone AH (El 120)
- Zone AH is defined as: “Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.”

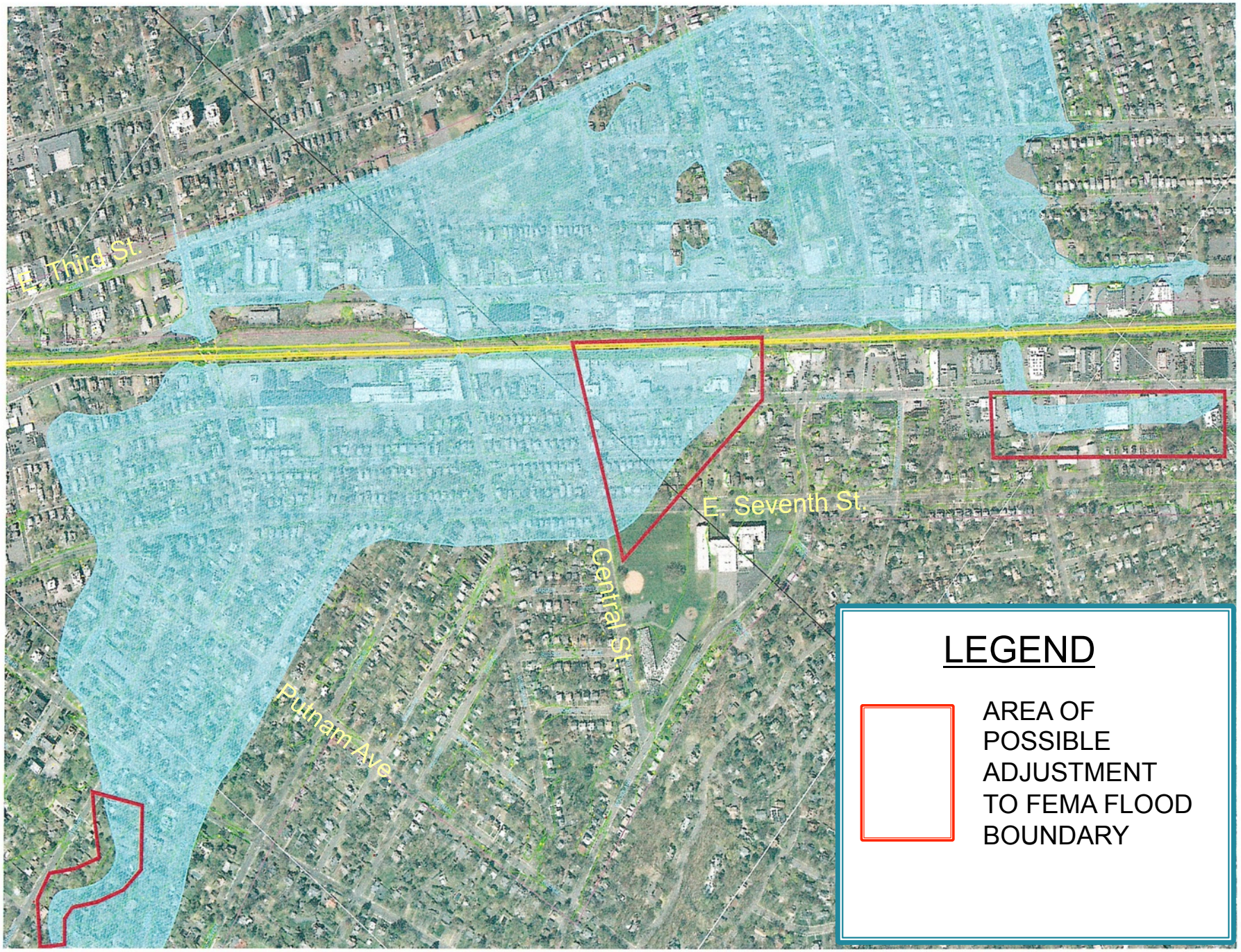
FEMA map


GREEN BROOK
SOMERSET COUNTY
UNION COUNTY
BOROUGH OF WATCHUNG
CITY OF PLAINFIELD
BOROUGH OF FANWOOD
City of Plainfield 345312
ZONE AE
ZONE AO
ZONE X
E. FRONT ST
E. SECOND ST
E. THIRD ST
E. FOURTH ST
E. FIFTH ST
E. SIXTH ST
E. SEVENTH ST
NORTH AVE
SOUTH AVE
CONRAIL
COLUMBIA AVE
SAINT NICHOLAS BLVD
TERRILL RD
PARK AVE
WATCHUNG AVE
ROOSEVELT AVE
FRANKLIN PL
PUTNAM AVE
BERCKMAN ST
CENTRAL ST
LELAND AVE
WOODLAND AVE
RADCLIFFE PL
LANSDOWNE TER
COOLIDGE ST
LINBARGER AVE
SHERLEY ST
LORAINE AVE
HELENE AVE
GRAY TER

REVIEW OF FEMA MAPS

- HMM overlaid the current FEMA flood boundaries on aerial survey provided by the City and compared the topography for inconsistencies.

- Three locations identified as possibly having questionable flood elevations or delineations.


E. Third St.
E. Seventh St.
Central St.
Putnam Ave.
LEGEND
AREA OF POSSIBLE ADJUSTMENT TO FEMA FLOOD BOUNDARY

REVIEW OF FEMA MAPS

- Portion of South Avenue near Leeland Ave.
  - Zone AH (El 120)
- Portions of South Ave, E Sixth St, E Seventh St, north of Berckmann St.
  - Zone AO (Depth 3')
- Portion of Prospect Ave between Cedar Brook Rd and E. Ninth St.
  - Zone AO (Depth 3')

REVIEW OF FEMA MAPS

- Portion of South Avenue near Leeland Ave.
  - Zone AH (El120)
  - Topo map indicates road is lower than lots.
  - Flood zone includes lots but not road.
  - Appears that flood zone delineation is shifted.

  - Options:
  - Individual property elevation certifications
  - Letter of Map Revision (LOMR) for small area.

REVIEW OF FEMA MAPS

- Portions of South Ave, E Sixth St, E Seventh St, north of Berckmann St.
  - Zone AO (Depth 3’)
  - Flood movement restricted by railroad embankment – flows through road openings.
  - FEMA does not give credit to RR embankment as barrier without geotechnical analysis.

  - Options:
  - Flood elevation certificates for individual properties.
  - Analysis of duration of flooding against RR with detailed analysis of RR embankment soil properties and potential seepage.

REVIEW OF FEMA MAPS

- Portion of Prospect Ave between Cedar Brook Rd and E. Ninth St.
  - Zone AO (Depth 3')
  - Ground elevation at some flood limits are inconsistent.
  - Options:
  - Flood elevation certificates for individual properties.
  - Field survey questionable locations and seek LOMR if justified.

SUMMARY AND RECOMMENDATIONS

- Summary:
- The flood of record for the Green Brook was Aug 1973.
- There was significant overflow from the Green Brook in 1973 and 1999 (Floyd).
- There was less overflow in 2011 (Irene).
- FEMA delineation maps are based on the estimated 100-year flood, not an individual flood event.

SUMMARY AND RECOMMENDATIONS

- Summary:
- FEMA delineations in Study Area are reportedly based on flood marks (per NJDEP).
- Review of delineations and current topo maps revealed potential inconsistencies at 3 locations.
- Sheet flow through the Study Area is currently being studied by the ACOE.

SUMMARY AND RECOMMENDATIONS

- **Immediate Actions**:
  - **For the area near South Ave. and Leland Ave.**
    - Pursue Individual Property Elevation Certifications.
    - Pursue a Letter of Map Revision (LOMR) if justified.

SUMMARY AND RECOMMENDATIONS

- **Immediate Actions:**
  - **For the full study area:**
  - Pursue the services of an outside firm with experience in reviewing and reducing NFIP insurance premiums.
  - Individual property owners may seek Elevation Certifications.
  - City of Plainfield secure improved rating in the NFIP's Community Rating System (CRS), which can provide discounted flood insurance premium rates.

SUMMARY AND RECOMMENDATIONS

- On Going Recommendations:
  - Coordinate with ACOE as their study of sheet flow through Plainfield progresses.
  - Obtain the results of the ACOE Study and use the data to review the flood delineations.
  - Seek a LOMR from FEMA if warranted.
    (It is possible that the findings may not significantly differ from those of the present FIRM for flood insurance purposes.)

Questions?

Hatch Mott MacDonald