HIGHLAND PARK TOWN HALL FLOODPROOFING AND LEXINGTON AVENUE TUNNEL
Highland Park Police and Fire Departments. The new City Hall and Community House, under construction, is seen in the background.

THE MEN WHO PROTECT HIGHLAND PARK
Town Hall: Elevationally Challenged

- Basement Finished Floor Elevations = 494.3 to 495.8
- First Floor Finished Floor Elevations = 505.5 to 506.6
- Channel FL = 486 to 489
- Effective 100-yr BFE = 504 to 507.5
Options Considered

- Improvements under the Town Hall
- Bypass storm sewer
- Floodproofing
- Floodproofing combined with flood reduction
Floodproofing Basics

Must either protect building from flooding and/or protect building and contents from flood damage

Building must be “substantially impermeable to the passage of water.”

Consider flood velocities, impact forces, and structural stability

Includes Utilities
Floodproofing Basics

- Must be 1’ above the BFE
- Materials in within 6” of floor must be flood resistant
- Can include passive and active measures
- City maintains records – FEMA does not review
- Only available for commercial buildings
Town Hall: Elevationally Challenged

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- First Floor Finished Floor Elevations = 505.5 to 506.6
- Channel FL = 486 to 489
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Lexington Ave Tunnel

- Lexington Ave is a significant obstruction
- Existing 6’ Arch and 5’ pipe
- Peak 100-year Q = 1420 cfs
Lexington Ave Tunnel


Legend
WS  100-year - Post-Project
WS  100-year - CE
WS  100-year - Multi (DE)
Ground

O'Brien Engineering, Inc.
Floodproofing Challenges

- Oldest portions of building are nearly 100 years old
- Built in several stages over several decades
- Lack of plans for older portions of construction
- Lack of detail in plans that are available
Challenges: Seepage
Challenges: Structural
Challenges: Structural
Challenges: Penetrations
Challenges: Utilities
Challenges: Access
Structural Evaluation

Figure 3B (3-D Scan)

Figure 3A (2-D Scan)
Structural Reinforcing

- Reinforce walls and floors exposed to floods
- Construct new supporting walls inside of existing weak walls
- Seal-off inaccessible floors to protect from flood hydrostatic pressure
- Construct flood wall along limited portion of creek to protect equipment and new basement areas
Utilities

- Removed utilities no longer in use
- Relocated some utilities out of higher velocity areas
- Sealed conduits
- Sealed penetrations
- Backflow preventers on drain outfalls
NOTES:
1. APPLIES TO ALL LOW-TEMPERATURE (<120°F) CREEKSIDE PIPES.
2. EQUIVALENT PRODUCTS MAY BE SUBSTITUTED AS APPROVED BY THE ENGINEER.
3. ALL PRODUCTS SHOULD BE COMPATIBLE WITH ADJACENT MATERIALS AND ENVIRONMENTAL CONDITIONS.
4. FOR INSULATED PIPES, REMOVE ADEQUATE PIPE INSULATION BEFORE APPLICATION OF PRODUCTS.
5. ALL SURFACES MUST BE PREPARED PER MANUFACTURER'S SPECIFICATIONS.
6. INSTALLATION SHOULD COMPLY WITH MANUFACTURER'S SPECIFICATIONS.
7. CONTRACTOR IS RESPONSIBLE FOR NOTIFYING THE ENGINEER OF ANY CONFLICTS BETWEEN MATERIALS OR BETWEEN MANUFACTURER RECOMMENDATIONS AND THESE PLANS.

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Sealing Potential Leaks

- Shotcrete porous and irregular surfaces
- Use membranes between new reinforcing walls and old walls
- Apply waterproofing compounds to existing limited porosity surfaces and shotcrete
- Install sump pumps to handle nuisance seepage
- Plug holes
Sealing Potential Leaks

O’Brien Engineering, Inc.
Town Hall Remodeling

- Proposed doubling the basement area
- Planned on placing jail cells in the basement
- We worked with architects to incorporate floodproofing considerations
- We reviewed the plans for consistency with floodproofing requirements
Lessons Learned

- Lots of challenges in floodproofing an older buildings
- Very few standard products or details for such irregular sealing
- Challenging to design and ensure proper construction
- Can be much more cost effective than some other options
Conclusion

- Lexington Tunnel successfully reduced the floodplain
  - Made floodproofing feasible
  - Brought four roads and five properties out of the floodplain
- Floodproofed the Town Hall
- Very economical, with the total cost, including engineering, of less than $500,000