

# Red Hook Small Business Hazard Mitigation Case Studies



- ▶ Case studies used to calibrate recommendations
  - Hazard environment
  - Range of businesses
  - Owned vs. leased space
  - Different building types

# Red Hook Small Business Hazard Mitigation Case Studies

## Methodology

- ▶ Red Hook Background
  - Business operations
  - Hurricane Sandy impacts
  - Storm Preparedness Challenges
  - Mitigation solutions



# Small Business Case Studies

- ▶ Small Artisan Fabricator: Flickinger Glass Works
- ▶ Mid-size Manufacturer: Linda Tool
- ▶ Café Restaurant: Ft. Defiance



# Hazard Risks and Consequences

- **Buildings**
  - Flooding
  - Power loss
- **Infrastructure (transportation)**
  - Staff access to business
  - Erratic response time for services recovery
- **Business Operations**
  - Document recovery
  - Lack of back-up of key records
  - IT and Telecommunications



Super storm Sandy flood water receding from MTA R line tunnel



# Flickinger Glassworks

## Business Operations:

- Small, artisan shop
- Custom repair and new glass fixture crafting using steel molds to specifications
- Staff of 8 to 16 based on business volume



# Flickinger Glassworks

## Hazard Risks:

- Located on Upper New York Bay
  - Near Buttermilk Channel
- Base Flood Elevation = +12 ft\*
  - Existing ground elev. +7 ft.
- Front door and rear doors and windows are not water-tight
- Industrial hanging doors between spaces increase risk

\* Base Flood Elevation based on FEMA post-Superstorm Sandy data



Connecting door between leased units allows water to enter Flickinger production area.

# Flickinger Glassworks

## Hurricane Sandy Impacts

- Flood depth of about 3 ft.
- Business off-line for 4 - 6 weeks
- Operating equipment motors destroyed
- Business records destroyed
  - Off-site back-up storage also destroyed
- Brackish water contaminated kiln lining brick



# Flickinger Glassworks

## Storm Preparedness Challenges

- Prevent flooding of business space
  - Includes flooding from adjacent businesses
- Difficulty in obtaining replacement parts for operational equipment
- Lost customer design archives
- Lost business records
- Staff availability via public transportation



Five at-risk custom kilns; this one features newly elevated electrical engine to the left of the kiln.



# Flickinger Glassworks

## Permanent Mitigation Solutions

- Elevate critical equipment such as kiln motors and polishing equipment
- Seal interior pass doors
- Scan and archive key customer designs using secure off-site provider



# Flickinger Glassworks

## Temporary Mitigation Measures

- Evacuate critical office equipment, and small production equipment
- Install pre-fabricated  $\frac{3}{4}$ " plywood over door and window openings
  - seal edges with spray foam
- Use jacks and block stands to elevate equipment
- Institute emergency communications via e-blast



# Linda Tool

## Business Operations:

- Mid-size manufacturer of machined metal parts
- Custom fabrication of finished metal parts/components
- Maintains International Standards Organizations (ISO) quality management certification
- Staff of 20 to 30 based on business volume



# Linda Tool

## Hazard Risks:

- Business is a few blocks inland from the Upper New York Bay and Erie Basin; Base Flood Elevation = 12 ft.\*
  - Existing ground elevation = + 6 ft.
- Two pedestrian doors and one overhead door
- Plant floor is 3.5 ft. above street level
  - Office space located on mezzanine level

\* Base Flood Elevation based on FEMA post-Superstorm Sandy data





# Linda Tool

## Hurricane Sandy Impacts

- Flood depth of 3 ft. in loading dock bay
- Sewer line back flow contaminated mechanical room and locker/restroom area
- Eleven months later still working to fulfill backlog orders



High water mark in  
mechanical/electrical switchgear  
room

# Linda Tool

## Storm Preparedness Challenges

- Prevent flood water from reaching production equipment
- Potential flood water damage to small tools and delicate measuring equipment
- Potential health hazards from sewer backflow
- Temperature and humidity control
- Staff availability via public transportation



Linda Tool production floor

# Linda Tool

## Permanent Mitigation Solutions

- Install backflow preventer valve
- Install watertight pedestrian doors
- Reorganize plant floor storage to elevate sensitive items



Small tools and measuring equipment  
Stored at floor level

# Linda Tool

## Temporary Mitigation Measures

- Install temporary flood barrier at loading bay door
- Install temporary flood barrier on plant floor around the loading bay
- Institute emergency communications programs

Approximate top of temporary  
Flood Barrier





# Fort Defiance Cafe

## Business Operations:

- Locally owned and operated neighborhood café and bar
- Staff of about 20
- Open 7 days/week
  - 10:00 AM to Midnight except Tuesday
  - 10:00 AM to 3:00 PM Tuesdays



# Fort Defiance Cafe

## Hazard Risks:

- Basement flooding
  - Through sidewalk entry
  - Through basement wall masonry
- Water damage to ground floor
  - Water rising from basement
  - Seepage through door



Sidewalk hatch door to basement

# Fort Defiance Cafe

## Hurricane Sandy Impacts

- Basement flooding damaged critical equipment and inventory
- Ground floor flooding damaged equipment, furnishings and fixtures
- Power failure caused loss of refrigerated food
- Electric meters for other tenants also located in basement

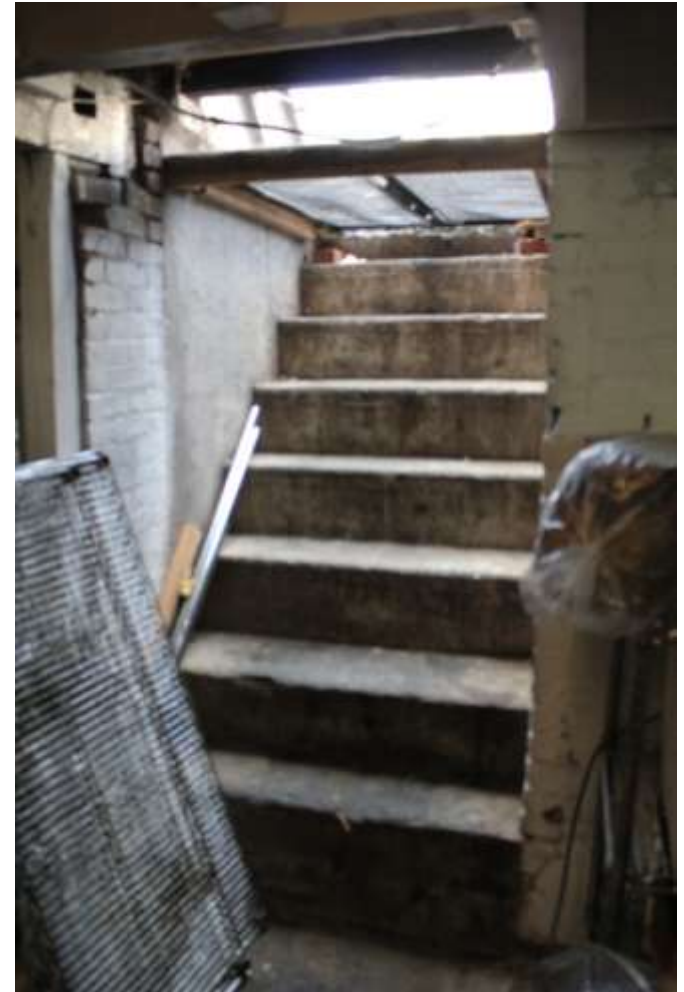


Electric service entrance in basement  
Meters for Fort Defiance Café and 2<sup>nd</sup> and 3<sup>rd</sup>  
floor tenants

# Fort Defiance Cafe

## Storm Preparedness Challenges

- Prevent basement flooding
- Prevent ground floor flooding of food preparation and dining areas
- Moving large quantity of small items to higher ground; e.g.
  - Food stuffs
  - Wine bottles
- Dewatering flood water from basement



Stairway from sidewalk hatch to basement



# Fort Defiance Cafe

## Permanent Mitigation Solutions

- Clean and repoint masonry walls
- Install flood door at front entry



Ft. Defiance basement masonry wall



F. Defiance front entry door

# Fort Defiance Cafe

## Temporary Mitigation Measures

- Temporary flood barriers at openings
- Conduct plumbing survey and seal unused drains
- Disconnect and relocate critical equipment
- Evacuate critical supplies and inventory prior to severe storm event



Temporary mitigation opportunity: fabricate temporary flood barrier to fit hatch frame. Install barrier and seal joints with spray foam.

# Case Study Summary

## ▶ Common challenges

- Flood damage to business assets
  - Operating equipment
  - Business records
- Staff availability/mobility
  - Mass transit-dependant
- Information on recovery assistance
  - Public sources
  - Private sources



Post Sandy flooding of MTA subway station

# Case Study Summary

## Special Challenges

### Leased Space

Authority/responsibility for mitigation

Shared risk with other tenants

### Space with Basement

Interior mitigation disruptive

Exterior mitigation costly

Flickinger Glassworks





# Case Studies

## Open Discussion/Questions

