

RESILIENT INDUSTRY STUDY

Technical Advisory Committee Meeting
April 7, 2016

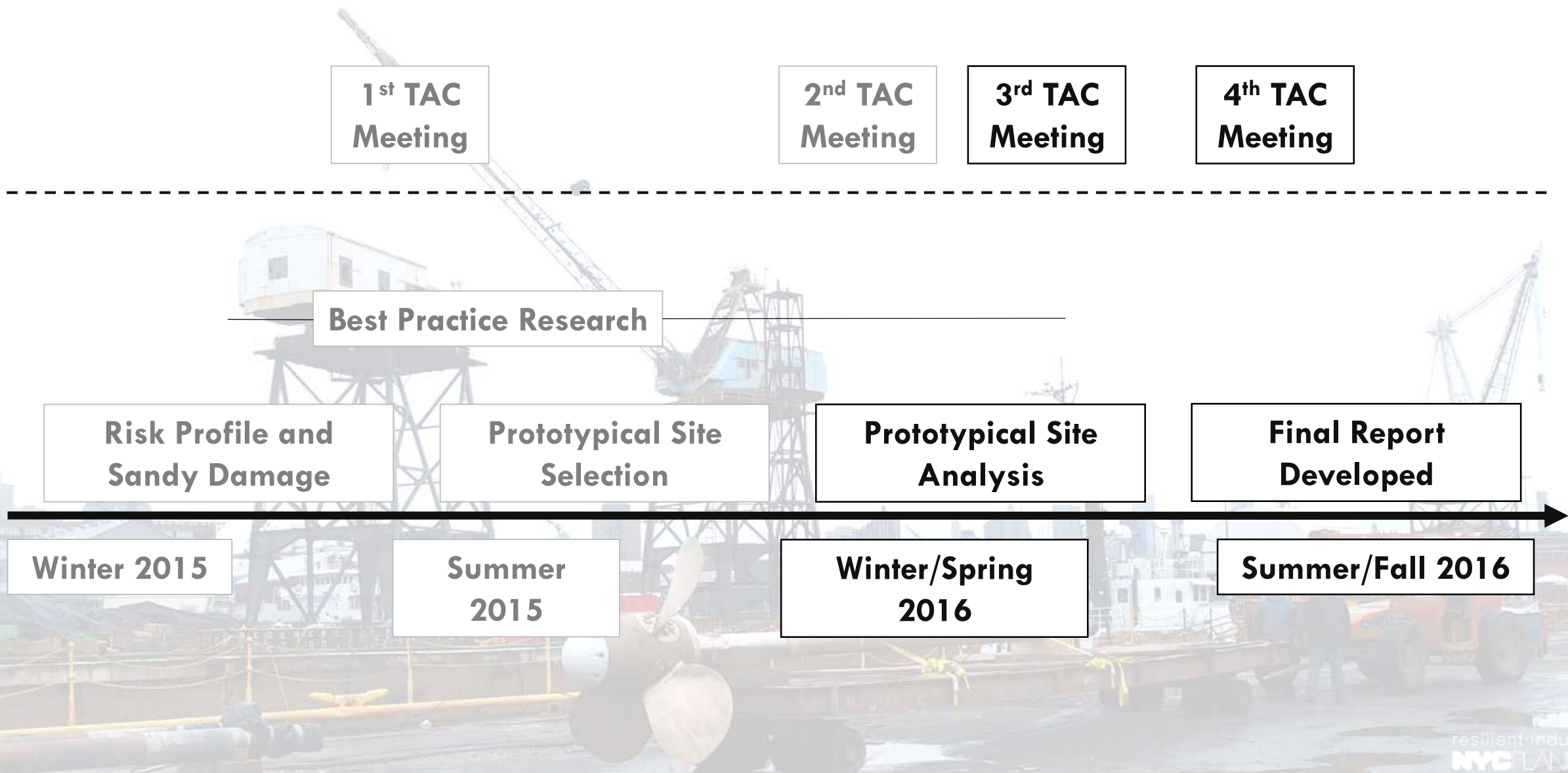


STUDY GOALS

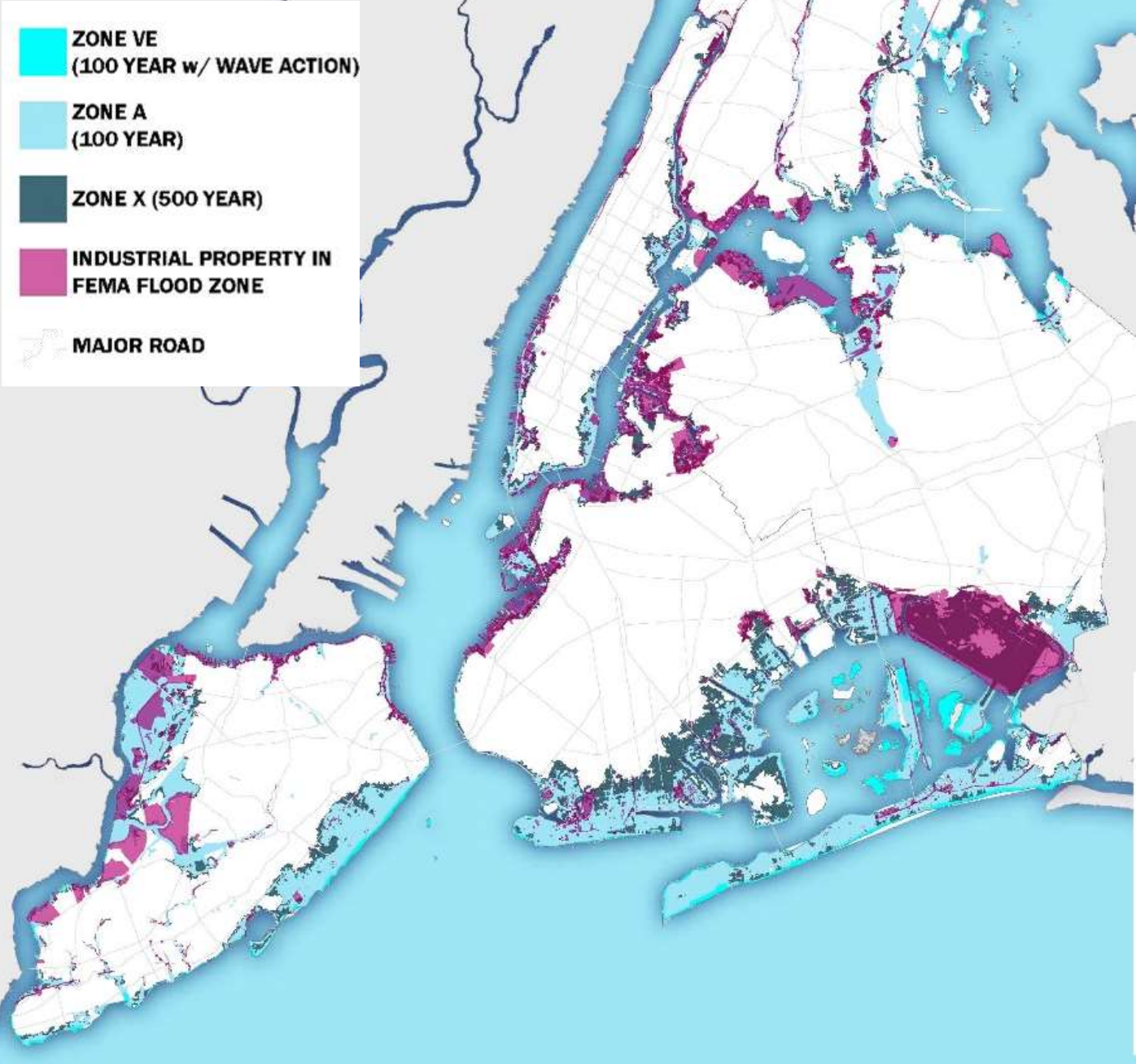
- Reduce flood hazards for businesses and residents in the City's industrial flood zones
- Identify appropriate emergency preparedness guidelines for businesses in industrial flood zones
- Promote cost-effective physical and operational strategies to protect businesses and the environment
- Identify financial and insurance challenges unique to businesses in industrial flood zones



TIMELINE



RISK ASSESSMENT OVERVIEW



Industrial property and businesses occupy much of the FEMA flood zone

District	Acres in Floodplain (X, A, V)	% of Citywide Manufacturing Districts
C8	438	19%
M1	7,265	41%
M2	2,365	72%
M3	5,495	69%
Total	15,564	50%

Flood Zone	Acres in Manufacturing District	% of Floodplain
X	5,173	41%
A	8,047	27%
V	2,343	11%
Total	15,564	24%

Analysis based on Preliminary FIRMs

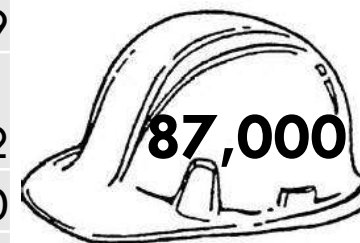
RISK ASSESSMENT OVERVIEW

Businesses in NYC Industrial Areas within the 1% Annual Chance Floodplain

Sector	# Businesses	# Employees
Industrial	1,683	45,697
Transportation and Warehousing	268	21,178
Wholesale Trade	503	8,066
Construction	316	6,136
Manufacturing	285	6,119
Motion Picture and Sound Recording / Telecommunications	83	1,819
Waste Management and Remediation Services	22	808
Repair and Maintenance	150	779
Motor Vehicle and Parts Dealers / Gasoline Stations	48	512
Utilities	8	280
Non-Industrial	1,955	41,719
GRAND TOTAL	3,638	87,416



**Businesses in
industrial
areas in 1% annual
chance floodplain**



**Jobs in industrial
areas in the 1%
annual chance
floodplain**

Source: NYSDOL QCEW 2014 3rd Quarter, FEMA Preliminary FIRM
Analysis includes all M and C8 Districts except airports

HURRICANE SANDY IMPACTS

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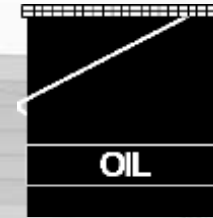
In the Sandy Inundation Area there were...



370 Food
Distribution
Businesses



400 Firms in
Transportation
Support Services



20% of the City's
Fuel Distribution
Facilities



2.57'
AVERAGE
FLOOD DEPTH



13.2'
HIGHEST
FLOOD DEPTH



Sandy Inundation Area:

- 5,500 Industrial Buildings
- Average Year Built: 1940
- 92% Predate Floodplain Regs.

1% Annual Chance Floodplain:

- 7,500 Industrial Buildings
- Average Year Built: 1946
- 87% Predate Floodplain Regs.

PROTOTYPICAL SITE ANALYSIS | Selection Criteria

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Building

- Construction materials
- Building height
- Floor-to-floor height
- Year Built
- Assessed Value



Site

- Lot size
- Parking
- Lot coverage
- Design Flood Elevation
- Drainage
- Adjacent land use
- Shoreline conditions



Use

- Wholesale
- Transportation / Warehousing
- Manufacturing
- Construction
- TV and Film
- Maritime Support

PROTOTYPICAL SITE ANALYSIS



PROTOTYPICAL SITE ANALYSIS | Interview Topics

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- General business information
- Physical layout
- Ownership / lease details
- Insurance coverage
- Flooding and recovery history
- Physical resiliency strategies
- Operational resiliency strategies



CONSTRUCTION MATERIALS DISTRIBUTOR : Sector Profile

- Positive construction market conditions expected to support industry growth nationally
- In NYC, employment in the building material and supply sector grew 6.8% between 2010 and 2014 within the City's Manufacturing Districts

Construction-Related Industries

	# Firms	# Jobs
Citywide	2,421	44,782
500 year floodplain	690	13,883
100 year floodplain	380	7,409

Source: NYSDOL QCEW 2014 3rd quarter

Analysis includes businesses in M-Districts outside of Manhattan, excluding paired-M-Districts and airports.

Includes NAICS Industry Sectors and Groups: Construction (23), Construction-Related Manufacturing (321, 327, 332, 333), Building Material Retail (444), Wholesale of Hardware, Plumbing & Heating Materials (4233), Lumber and Other Construction Materials (4237), Metal & Mineral Merchant Wholesale (4235)

CONSTRUCTION MATERIALS DISTRIBUTOR : Business Profile

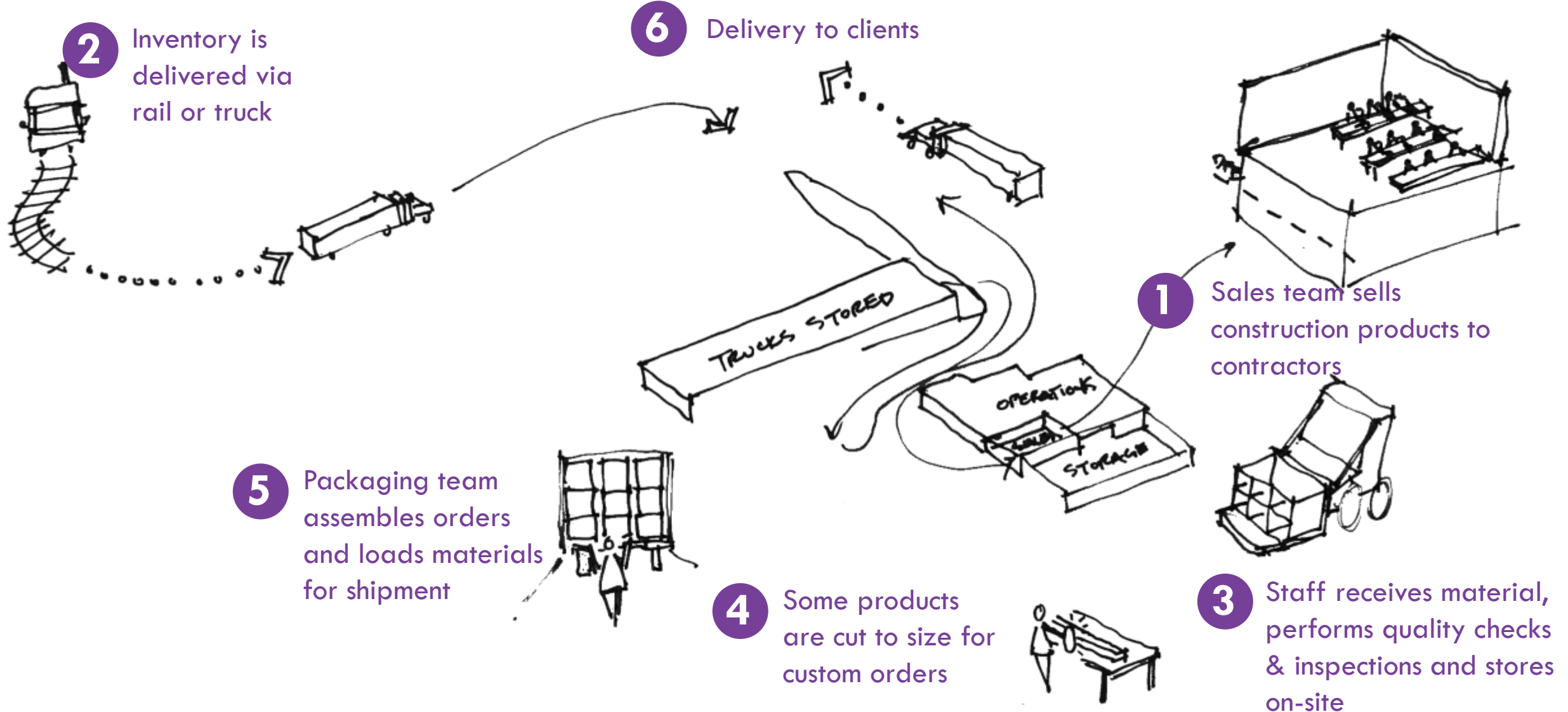
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- Construction materials distributor with multiple locations on the East Coast.
- Majority of business is from distributing construction materials to contractors at job sites rather than on-site pickup.
- Maintain fleet of dozens of commercial trucks.
- 50-100 employees operating 24 hours/day.



CONSTRUCTION MATERIALS DISTRIBUTOR : Operational Flow

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CONSTRUCTION MATERIALS DISTRIBUTOR : Resiliency Challenges

1. Open uses and inventory stored improperly may be damaged
2. Machinery left below the DFE may be damaged during a flood
3. Exposed openings may allow water into the building
4. Reliance on bridge / road infrastructure may put productivity at risk
5. Poor bulkhead conditions can lead to erosion & major flood damage

CONSTRUCTION MATERIALS DISTRIBUTOR : Resiliency Challenges

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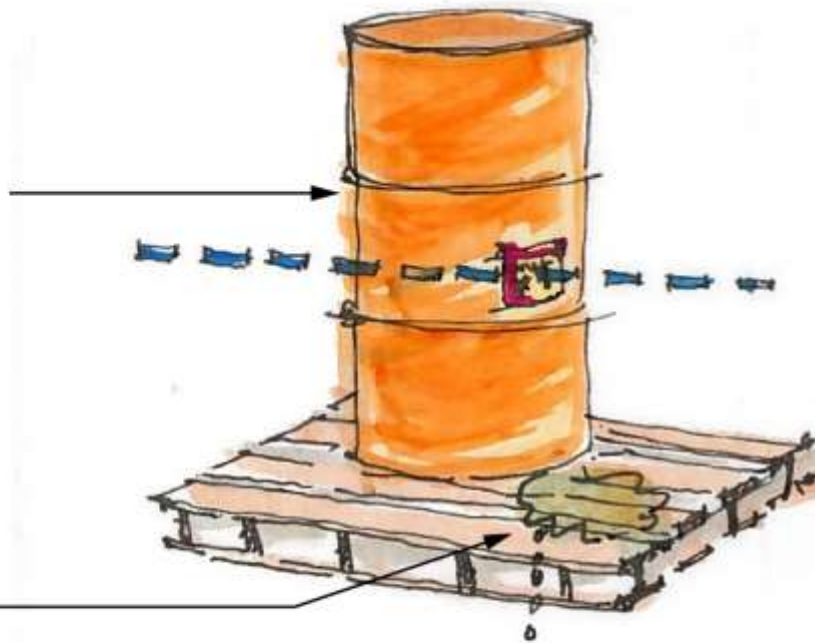


CONSTRUCTION MATERIALS DISTRIBUTOR : Resiliency Challenges

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Hazardous materials can put workers and neighboring communities in danger when flooding occurs

Protection from leakages and spills should be a high priority



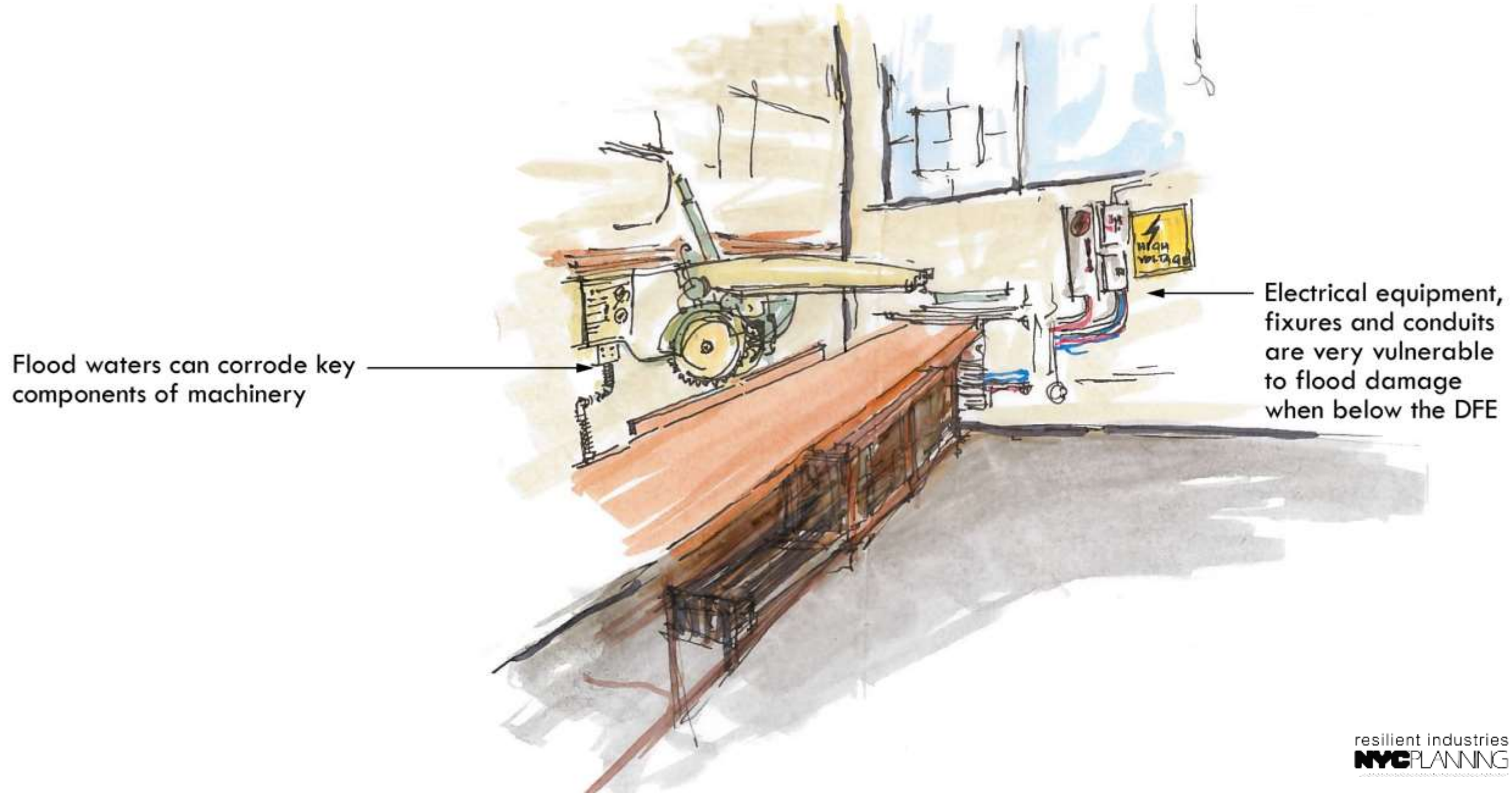
CONSTRUCTION MATERIALS DISTRIBUTOR : Resiliency Challenges

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CONSTRUCTION MATERIALS DISTRIBUTOR : Resiliency Challenges

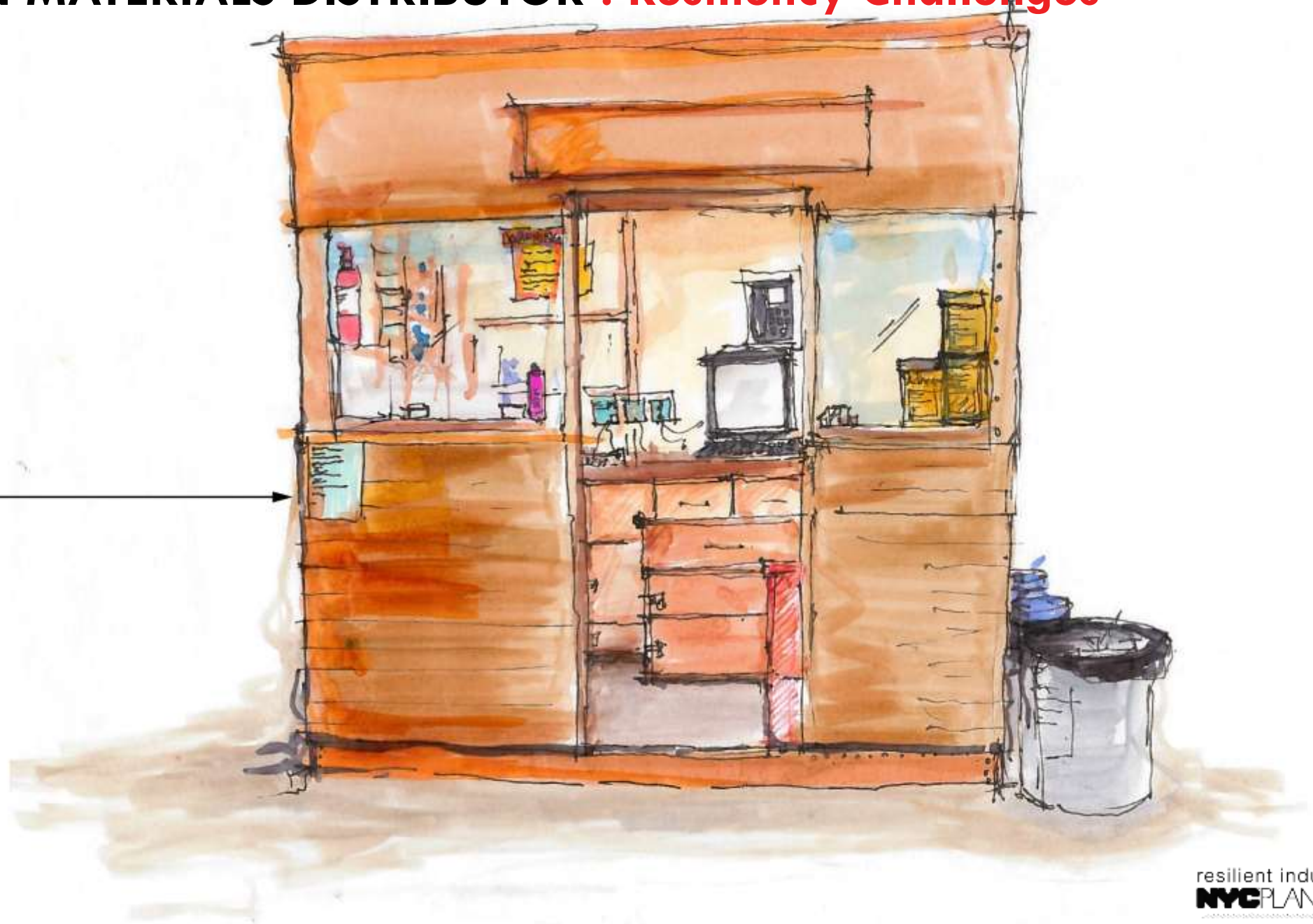
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CONSTRUCTION MATERIALS DISTRIBUTOR : Resiliency Challenges

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Work stations and unanchored ancillary structures constructed with lightweight building materials are vulnerable to displacement



CONSTRUCTION MATERIALS DISTRIBUTOR : Resiliency Challenges



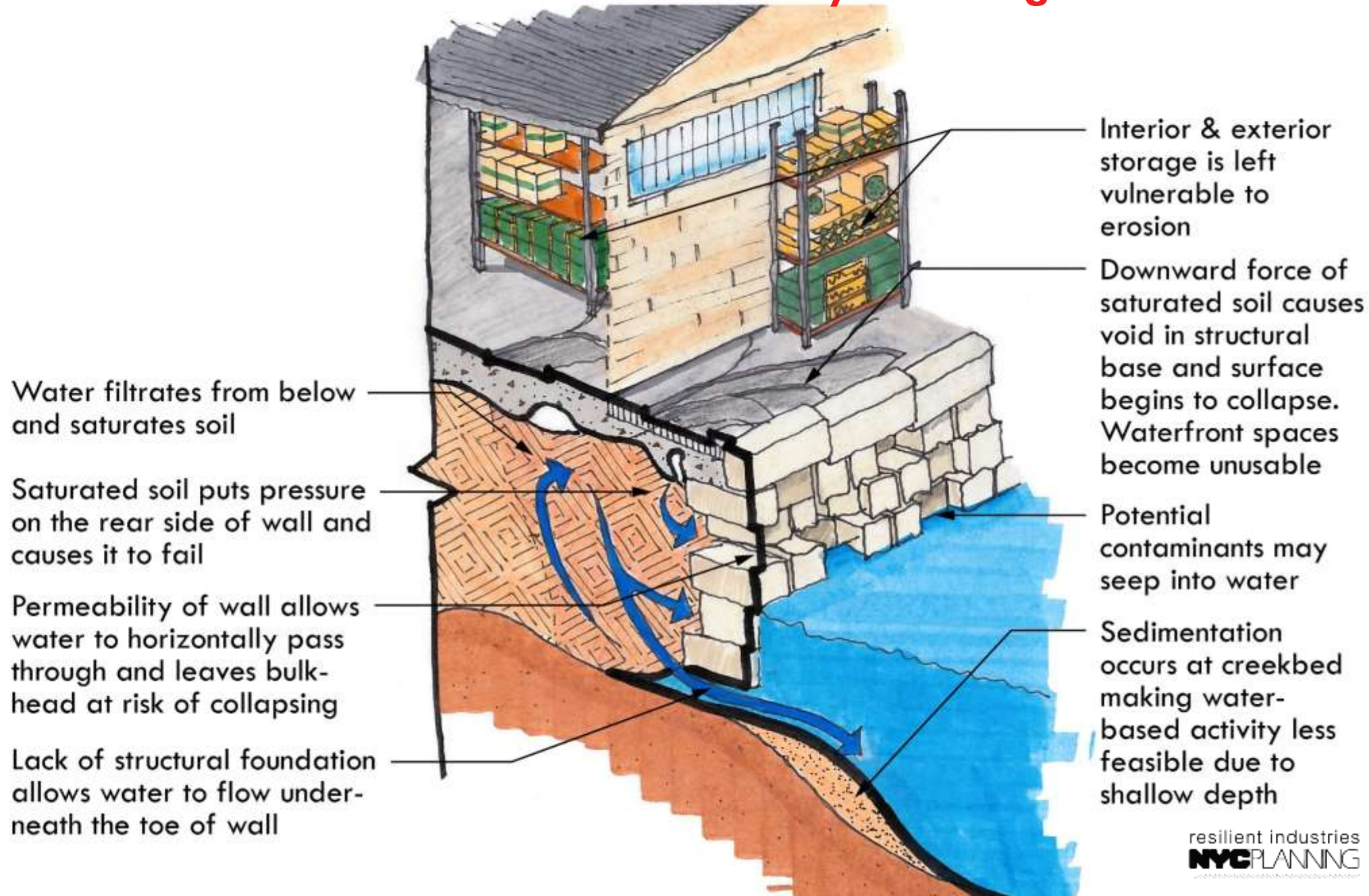
Essential business operations may be halted if equipment is damaged from flooding

CONSTRUCTION MATERIALS DISTRIBUTOR : Resiliency Challenges



CONSTRUCTION MATERIALS DISTRIBUTOR : Resiliency Challenges

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1. Proper anchoring to keep storage equipment in tact
2. Catchment facilities to prevent hazardous materials spillage
3. Create mechanisms to move fueling tanks to higher ground
4. Water-tight storage to protect valuable inventory
5. Elevate mechanical equipment
6. Protect openings for loading
7. Bulkhead reconstruction for maritime access
8. Green infrastructure to treat stormwater runoff

CONSTRUCTION MATERIALS DISTRIBUTOR : Resiliency Measures

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Straps to tie down materials can help mitigate wind damage

Heavy duty systems that employ enhanced joinery connections and braces at corners can help mitigate wind damage

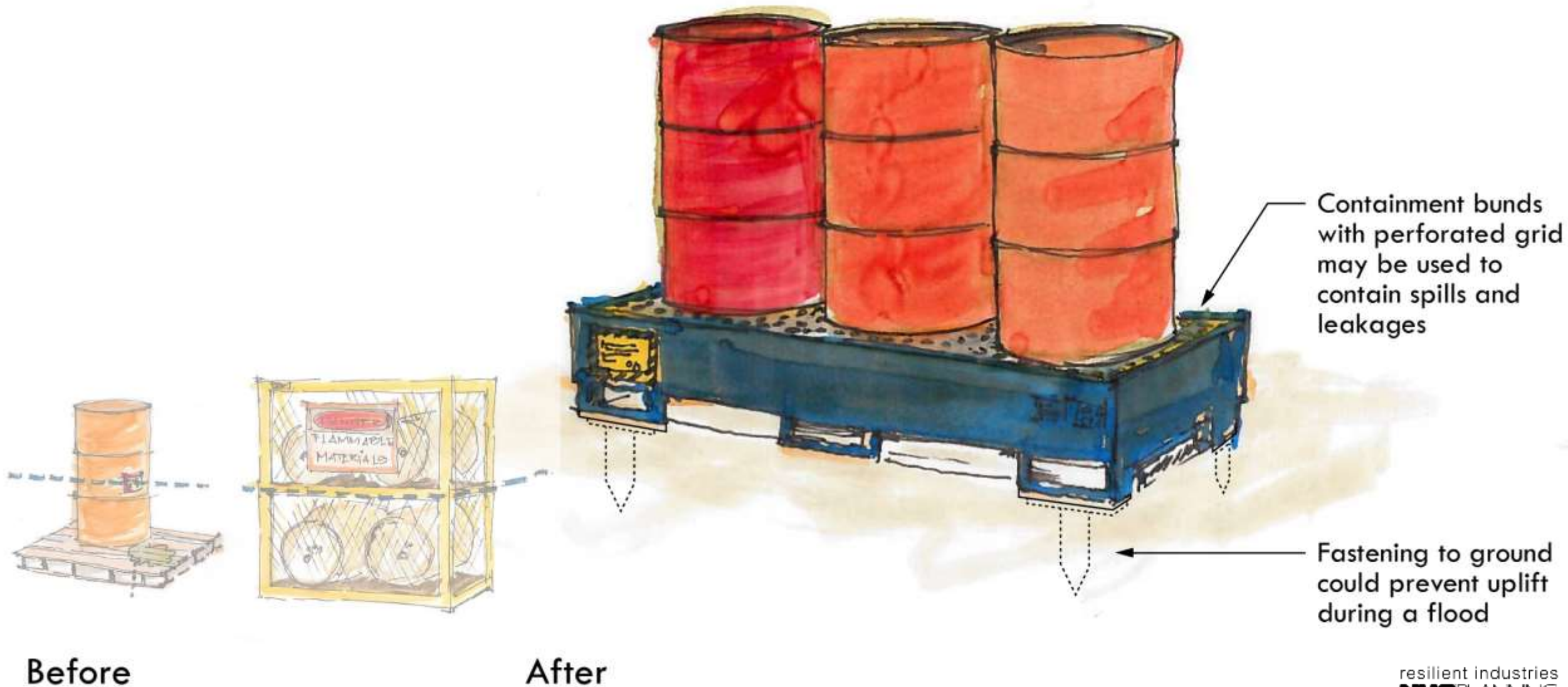
Outdoor shelving designed with base plates anchored to ground can mitigate flood damage

Before

After

CONSTRUCTION MATERIALS DISTRIBUTOR : Resiliency Measures

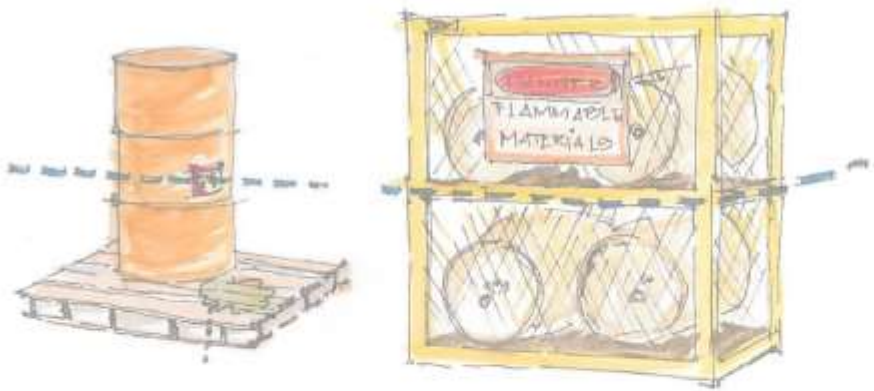
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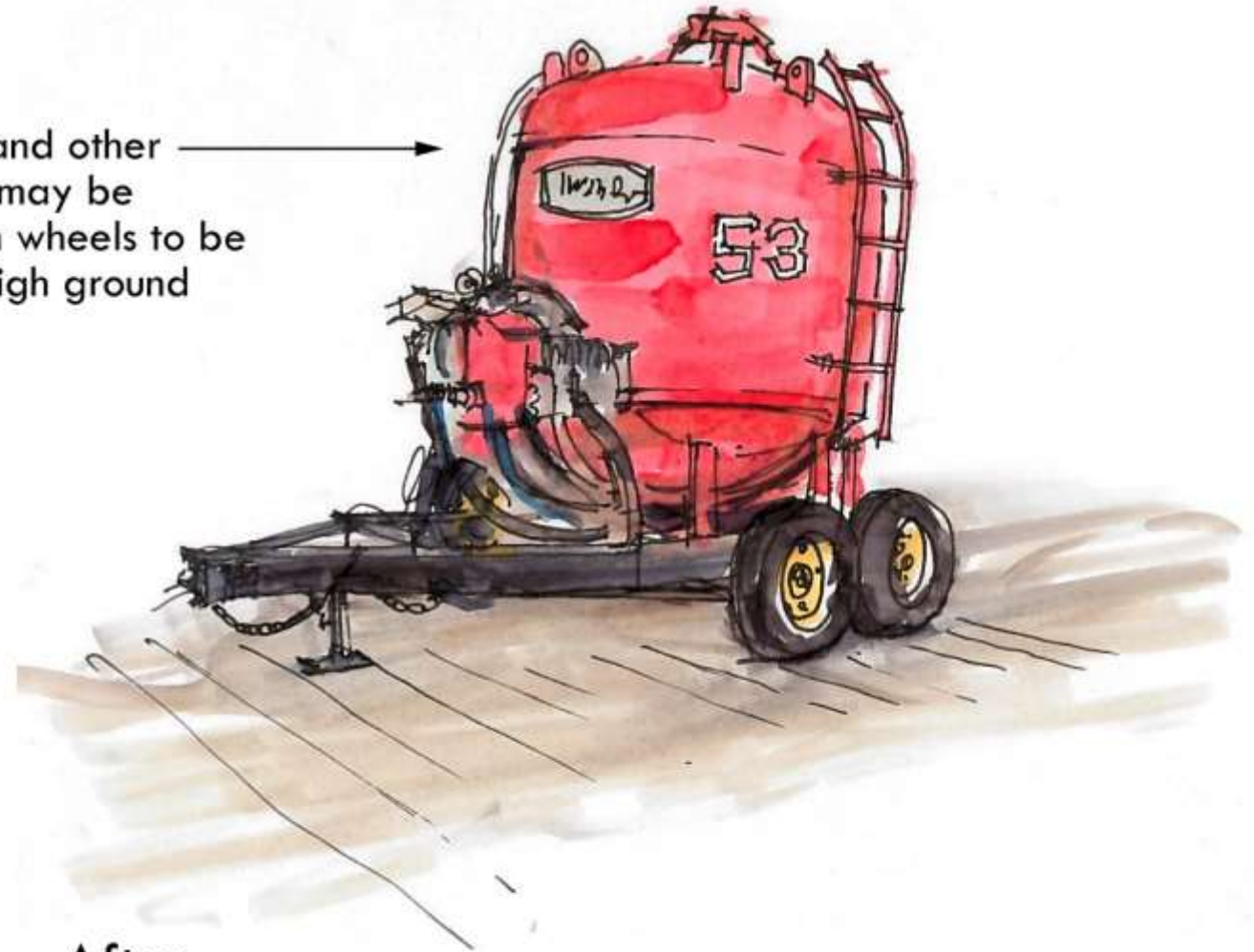
CONSTRUCTION MATERIALS DISTRIBUTOR : Resiliency Measures

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Fuel tanks and other equipment may be mounted on wheels to be moved to high ground



Before



After

CONSTRUCTION MATERIALS DISTRIBUTOR : Resiliency Measures

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i Sealed containers cost
\$2400 - \$2800



Before



After



Containers that are designed with water-tight doors can ensure safer storage of materials

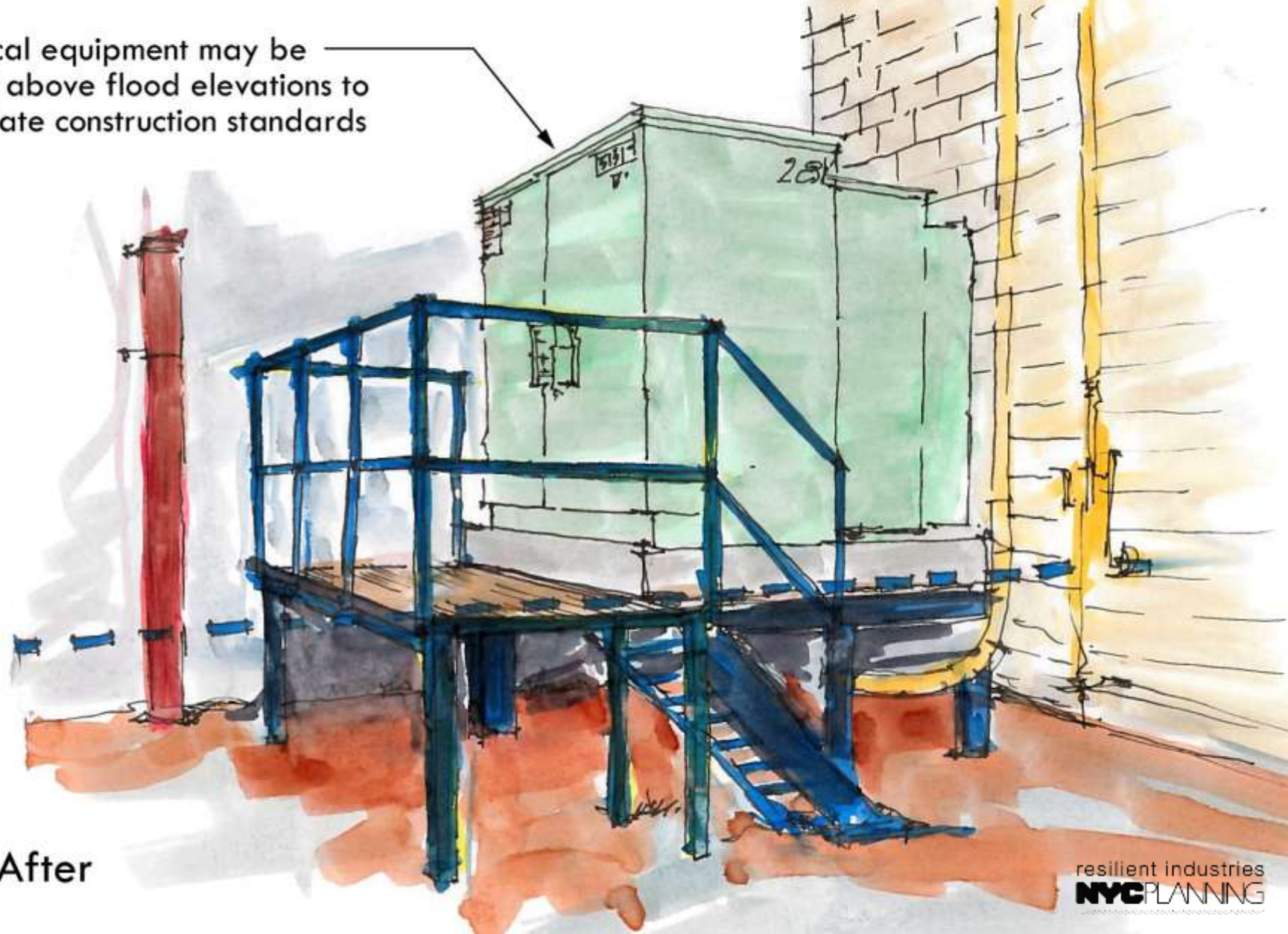
CONSTRUCTION MATERIALS DISTRIBUTOR : Resiliency Measures

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Mechanical equipment may be elevated above flood elevations to appropriate construction standards



Before



After

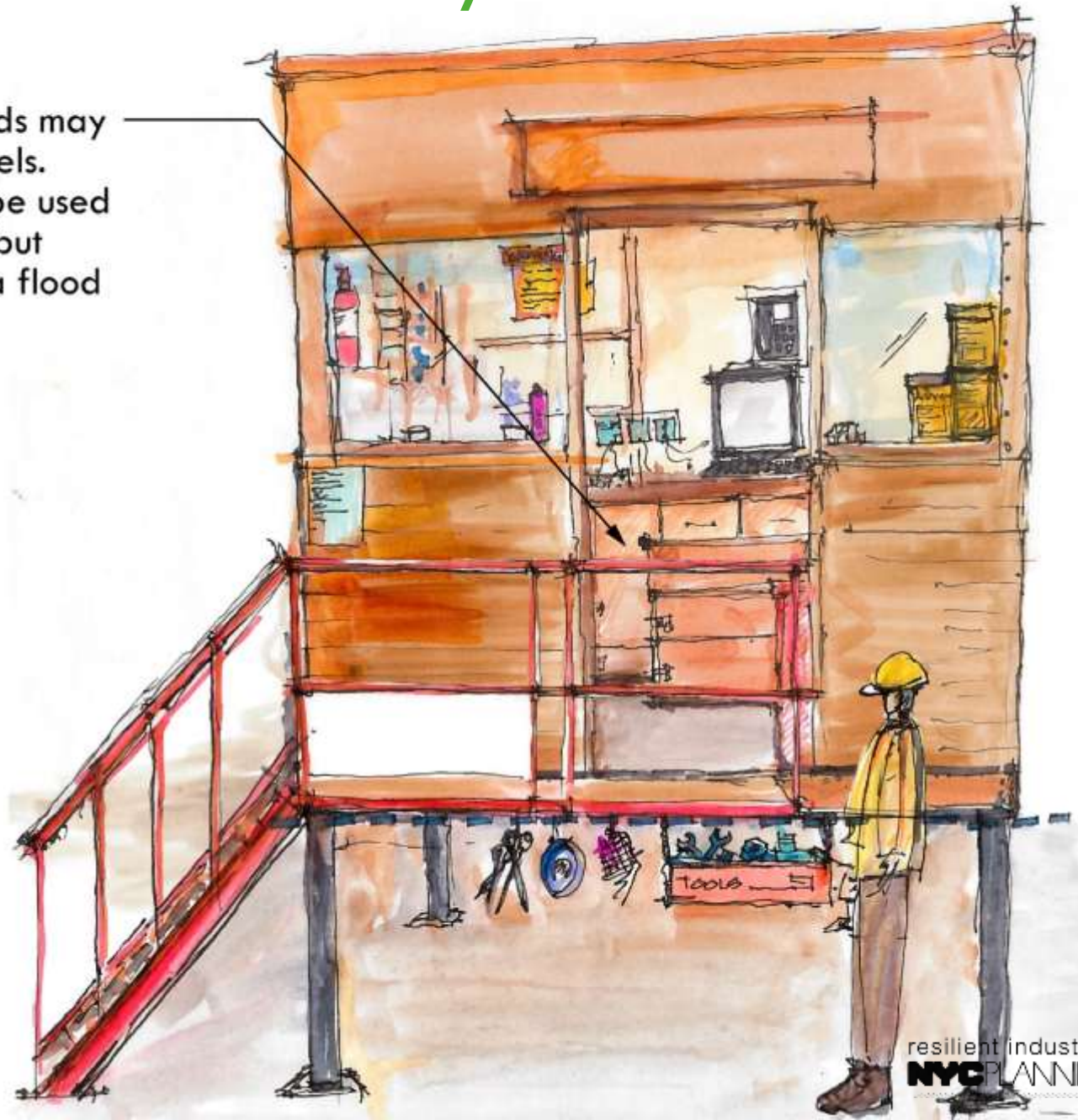
CONSTRUCTION MATERIALS DISTRIBUTOR : Resiliency Measures

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Worker stations and tool sheds may be elevated above flood levels. Areas below elevation may be used to store tools and essentials, but should be relocated before a flood



Before



After

CONSTRUCTION MATERIALS DISTRIBUTOR : Resiliency Measures

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Flood shields installed around openings will help prevent floodwaters from entering. The building must be structurally reinforced to withstand hydrostatic/hydrodynamic forces.



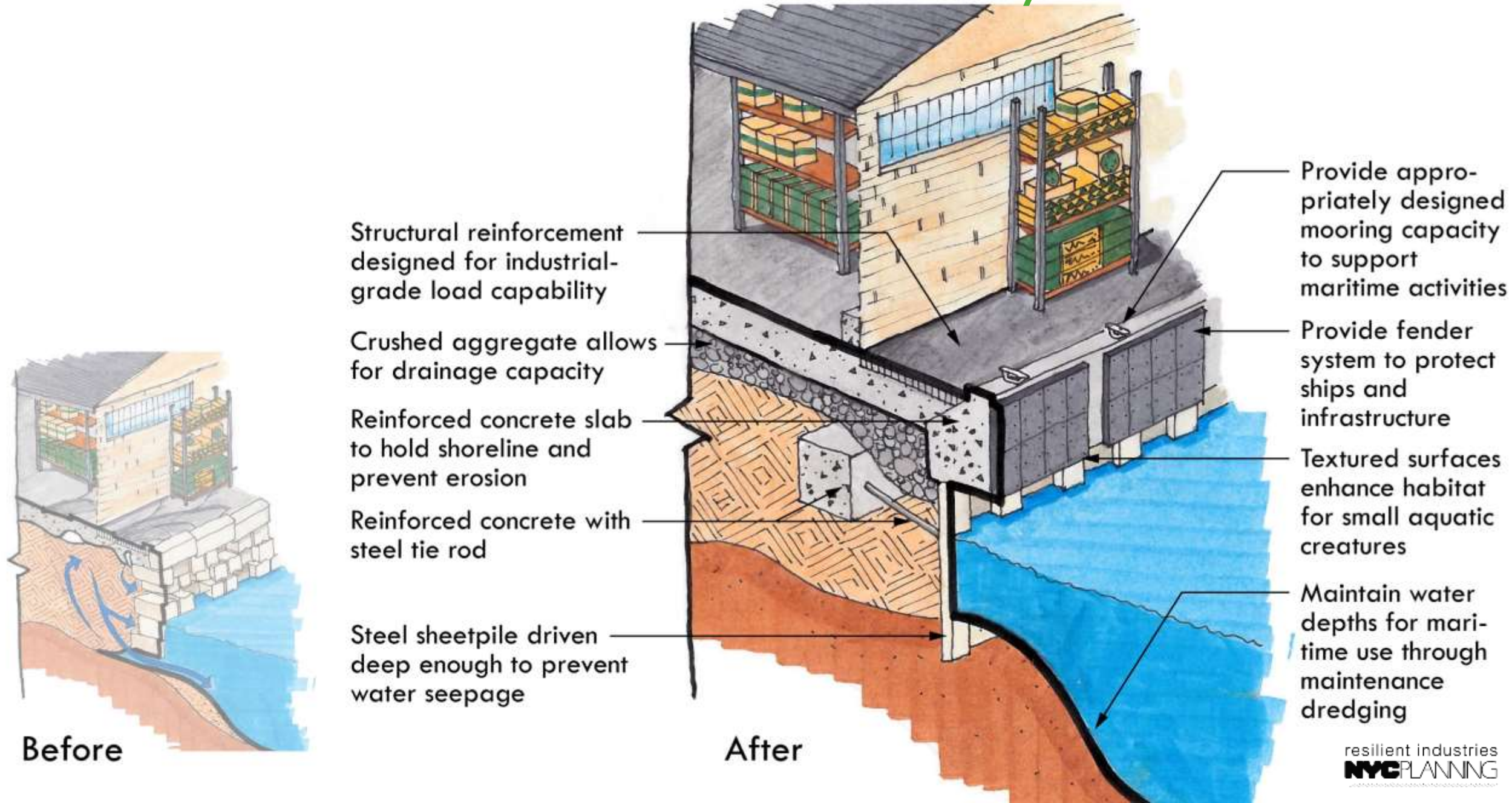
Before



After

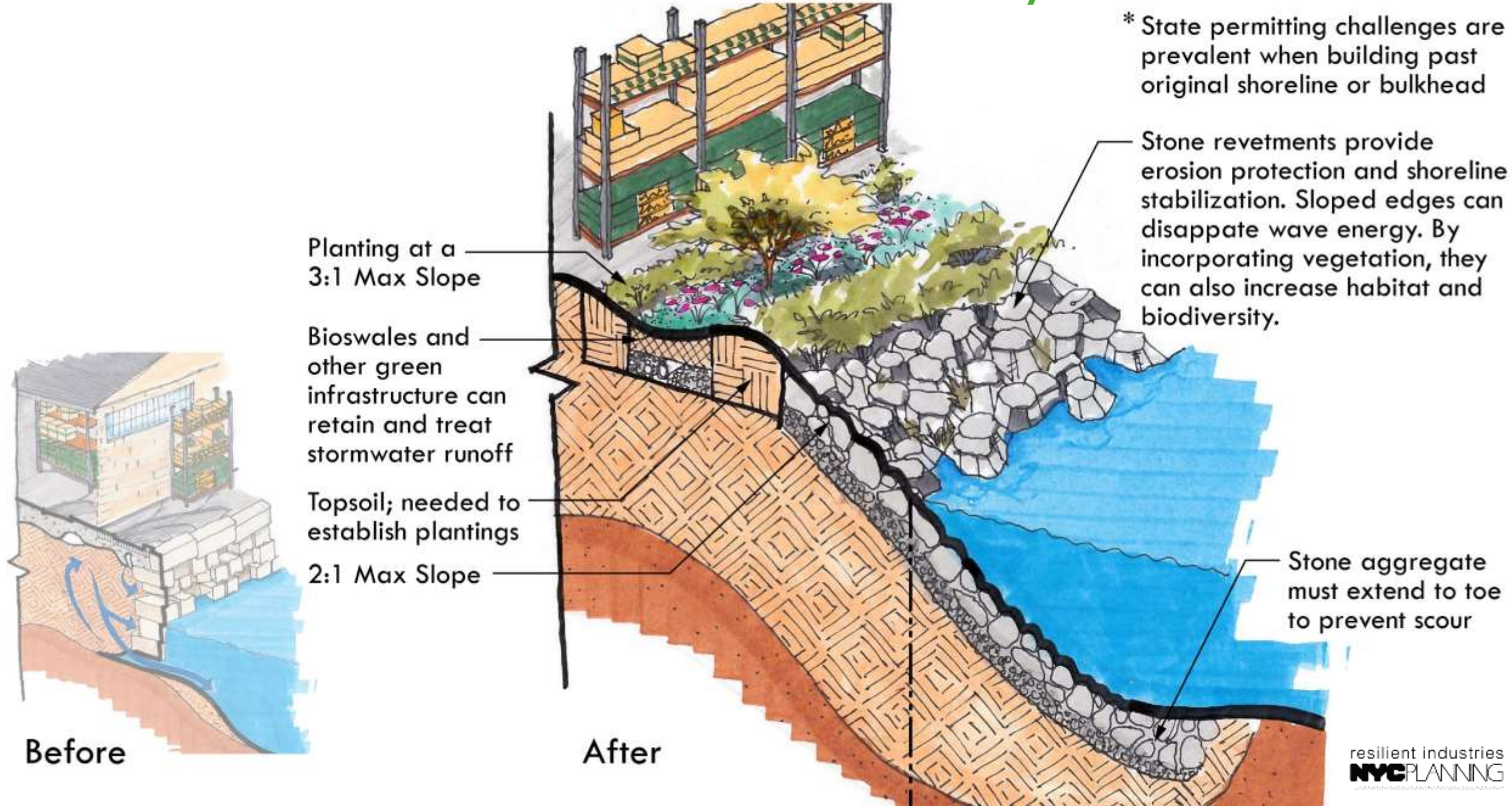
CONSTRUCTION MATERIALS DISTRIBUTOR : Resiliency Measures

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CONSTRUCTION MATERIALS DISTRIBUTOR : Resiliency Measures

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CONSTRUCTION MATERIALS DISTRIBUTOR : Preparedness Strategies

Ongoing:

Business Continuity Planning

- Identify and prioritize the protection of critical systems and high-value items.
- Back up and store critical documents and files off-site.
- Fully understand insurance coverage and limitations.
- Assign business continuity responsibilities to employees and document after-hour communication methods.
- Pre-script communication with customers about potential delivery changes.

36-72 hours

- Relocate, elevate or secure in-place inventory and critical equipment.
- Store fuel and hazardous materials out of floodplain and/or off-site.
- Install flood barriers if present. At minimum, consider emergency measures such as sandbags.
- Inspect backup power supply.
- Contact insurance broker or agent.

Within 36 hours

- If potential exists for wind damage, remove supplies from upper shelves or secure in-place.
- Move trucks and other vehicles to higher ground parking.
- Store propane in cages according to FDNY permits.
- Ensure employees are aware of announced evacuations as well as road and tunnel closures.
- Activate emergency shut off for critical systems.

POLICY CONSIDERATIONS

Information

- Forecasts and alert systems
- Technical assistance

Insurance

- Coverage
- NFIP flexibility

Physical Improvements

- Bulkheads and shoreline improvements
- Hazardous material storage

Commercial Vehicles

- Locations for commercial truck parking

Land use

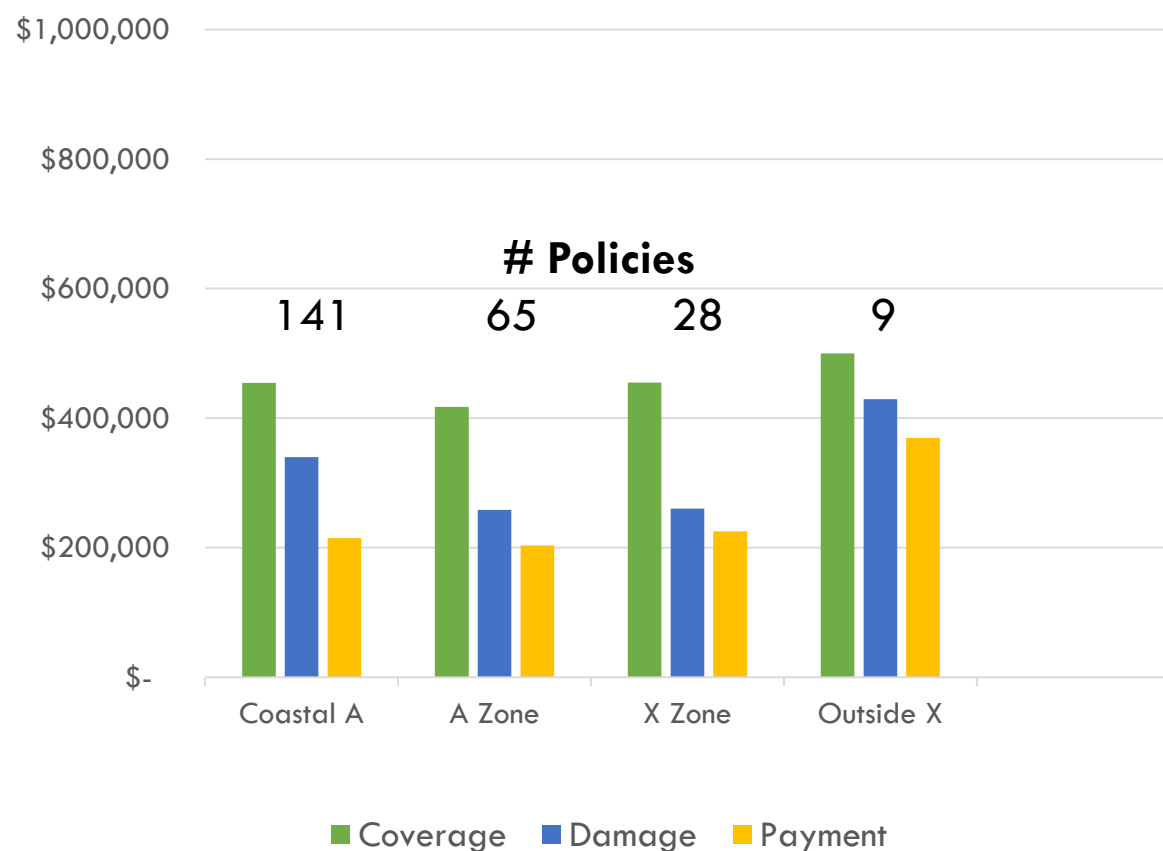
- Zoning constraints to resiliency improvements
- Resiliency measures specific to V and/or coastal A zones



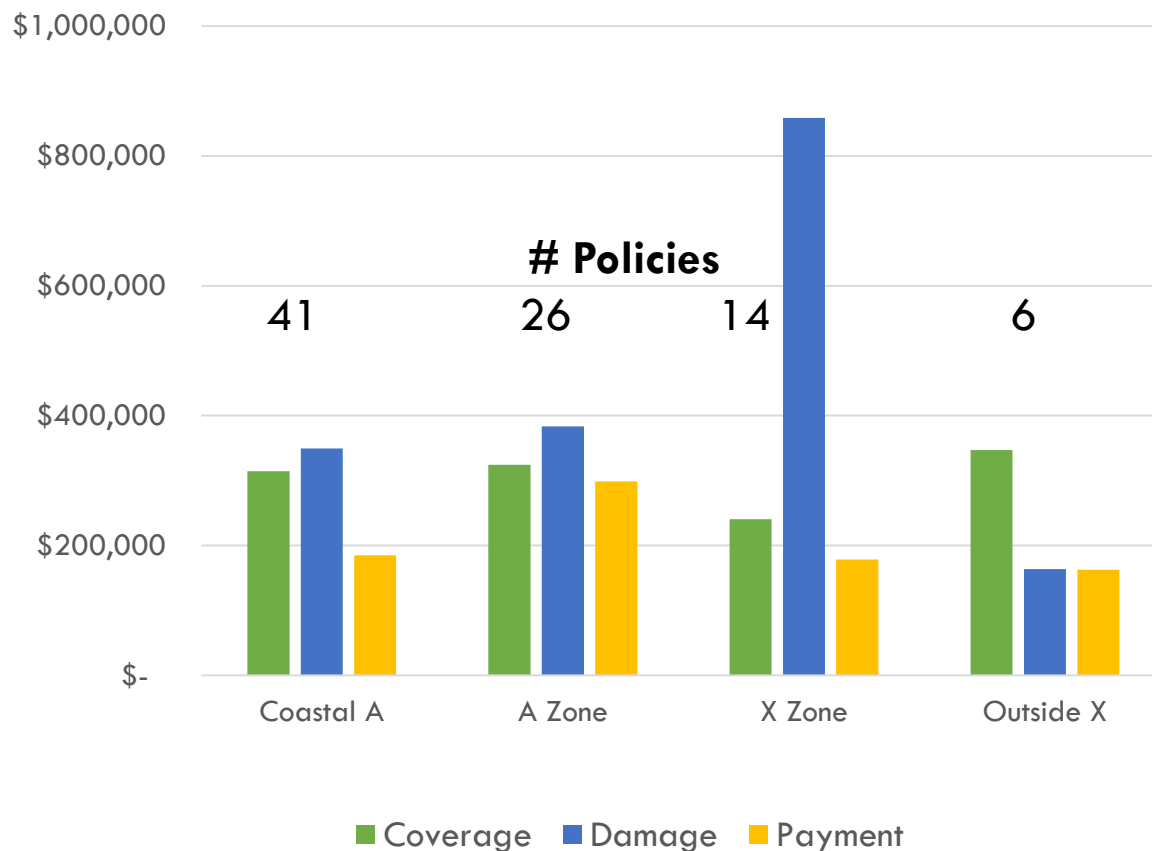
National Flood Insurance Program: Claims from Hurricane Sandy

Content damage often exceeded coverage limit

Nonresidential NFIP Claims: **Buildings**



Nonresidential NFIP Claims: **Contents**



- NFIP **coverage limit is insufficient** for many industrial businesses.
- NFIP provides **little flexibility for partial floodproofing**
- Premium reductions are unavailable for a range of mitigation strategies
- Single story industrial buildings are particularly constrained in terms of the options available to them under the NFIP
- Elevation certificates may help businesses take advantage of partial floodproofing
- Tenant businesses cannot insure the building for flood damage, making it difficult to invest in structural resiliency measures

QUESTIONS AND DISCUSSION

