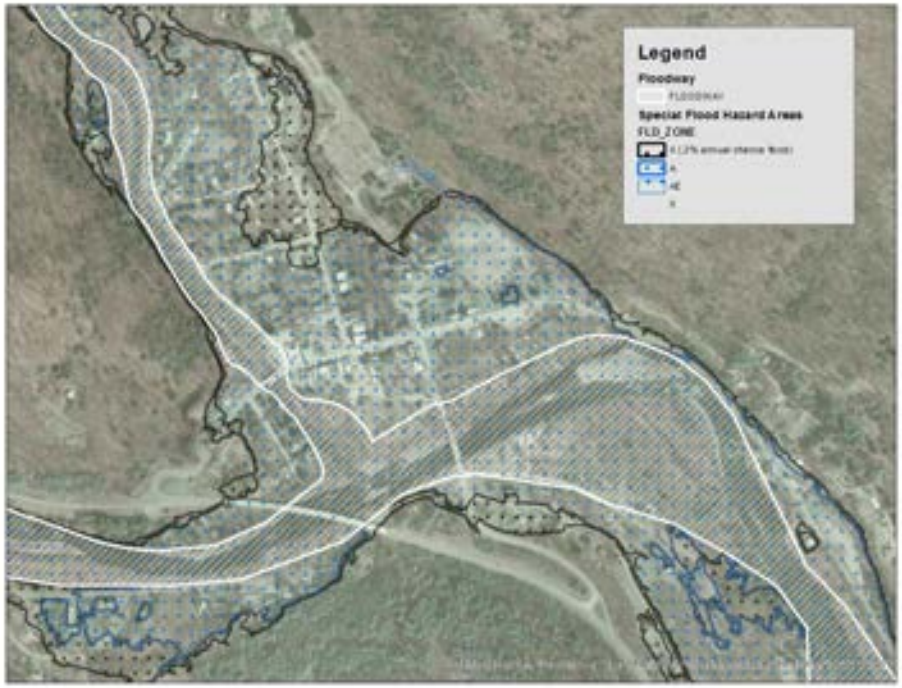
NYC Environmental Protection

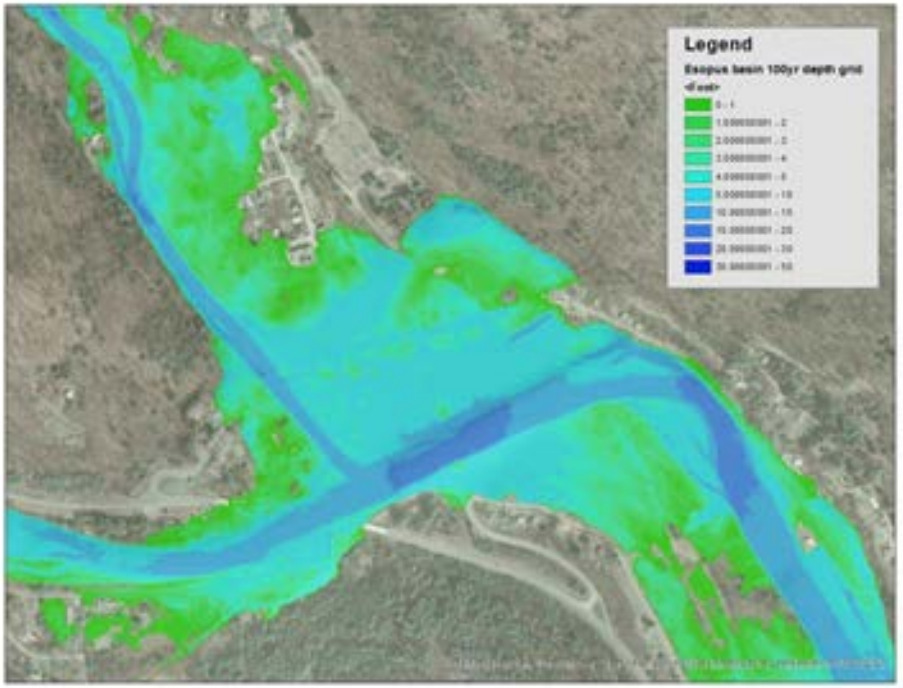
Using Depth Grids

A tool for flood preparedness, emergency response and flood hazard mitigation planning

DFIRM vs. Depth Grid



DFIRMS DISPLAY THE BOUNDARIES OF THE FLOOD ZONES



DEPTH GRID GIVE SITE SPECIFIC ESTIMATES OF FLOOD DEPTH

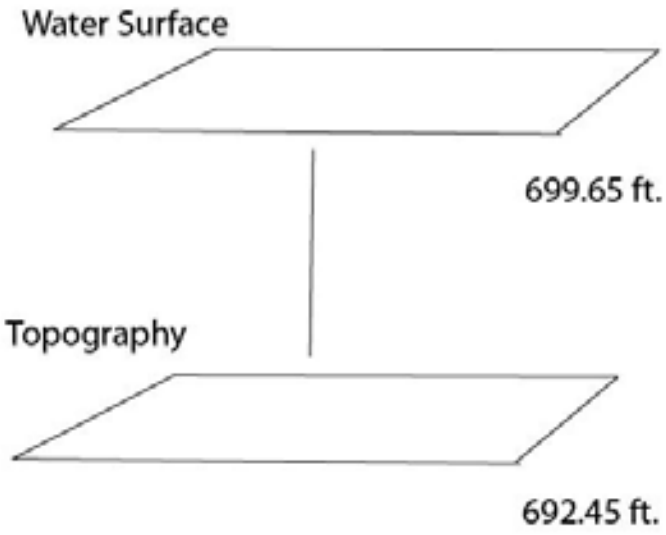
Creating depth grids

As new flood studies are conducted by FEMA a wealth of information is updated and refined:

- Topography – new LiDAR based topographic maps and hundreds of cross section surveys of channel and floodplain elevations and revised maps of stream alignments
- Hydrology – updated information on flood flows and recurrence probability
- Hydraulics – updated information on how the change in flows interacts with the topography, landcover and infrastructure
- All this information has been used to create the new preliminary flood maps and the RISK Map depth grids

Creating Depth Grids

- Once the topography and the hydrology is combined in the hydraulic model to create a water surface in HEC, the depth grid can be created.
- The grid is the difference between the elevation of the water surface and the ground at the same location (pixel)



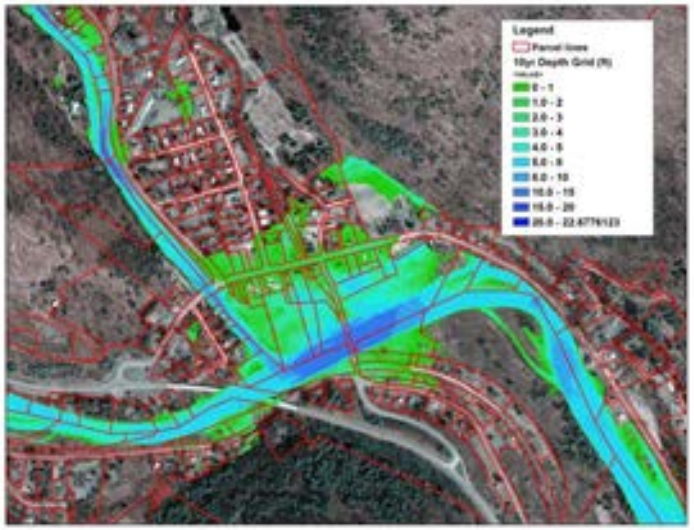
Water Surface - Topography = Depth

699.65 ft - 692.45 ft. = 7.2 ft

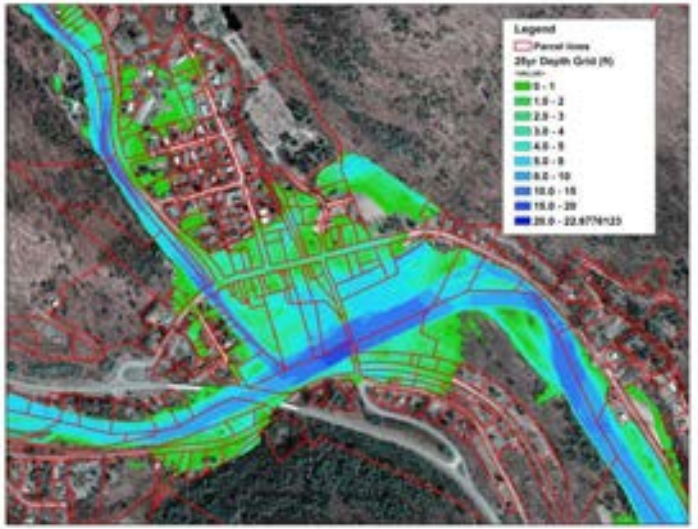
What Depth Grids are Available

NYC Environmental Protection

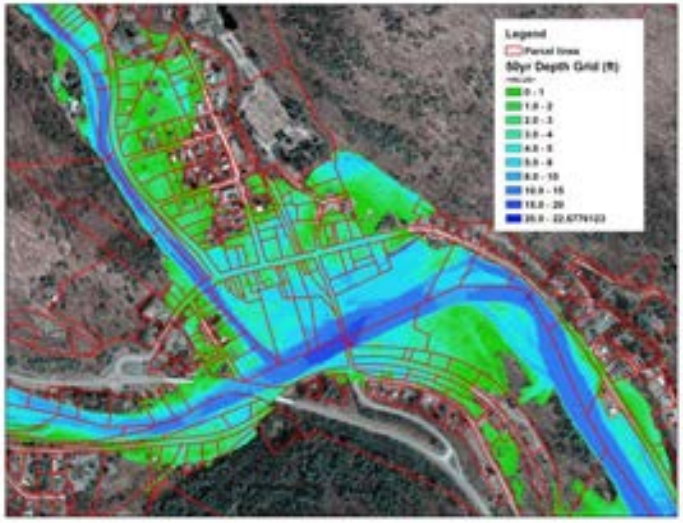
10 year Depth



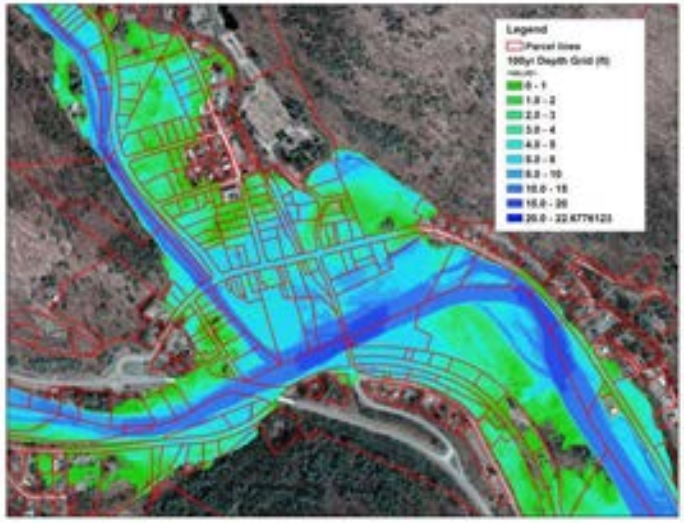
25 year Depth



50 year Depth



100 year Depth



Depth Grid Availability

- Risk Map depth grids are currently available for Ulster County areas studied under FEMA contract number HSFEHQ-09-D-0369 (not available for areas outside of the NYC watershed)

Using Grids to Estimate Water Depth

Depth Grid Uses

- Depth grids are useful for a variety of planning and decision making actions:
  - Flood emergency preparedness
  - Flood emergency response
  - Flood hazard mitigation planning
  - Community planning – comprehensive and site plan review

- Depth grids are non regulatory – you cannot use them for flood zone determinations, but they can be used to inform decisions.

Emergency Preparedness

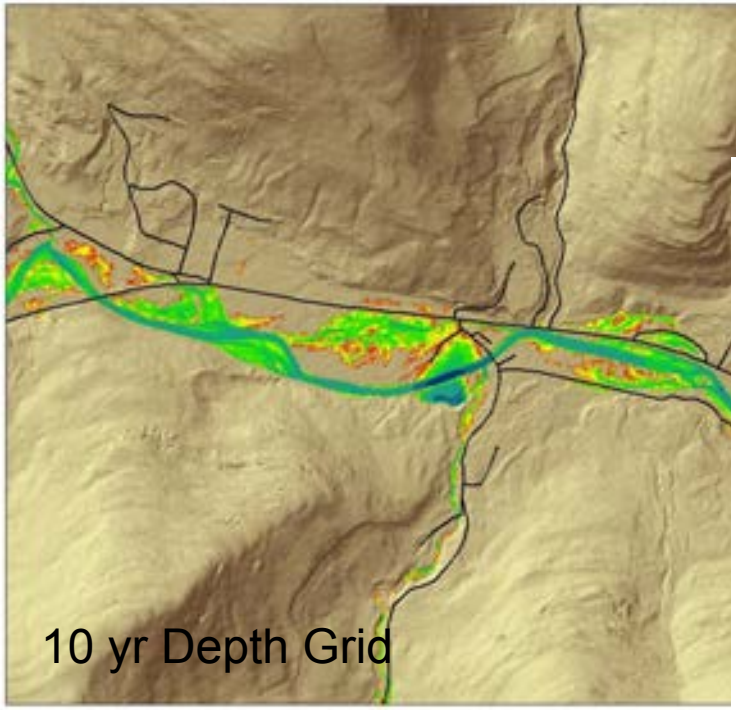
- Depth grids can also be related to the stage of the flood on a gage
- Once stage for each return interval is known then you can plan/ review evacuation routes and impacts on critical actions (sheltering, access, and when actions are needed to protect facilities)

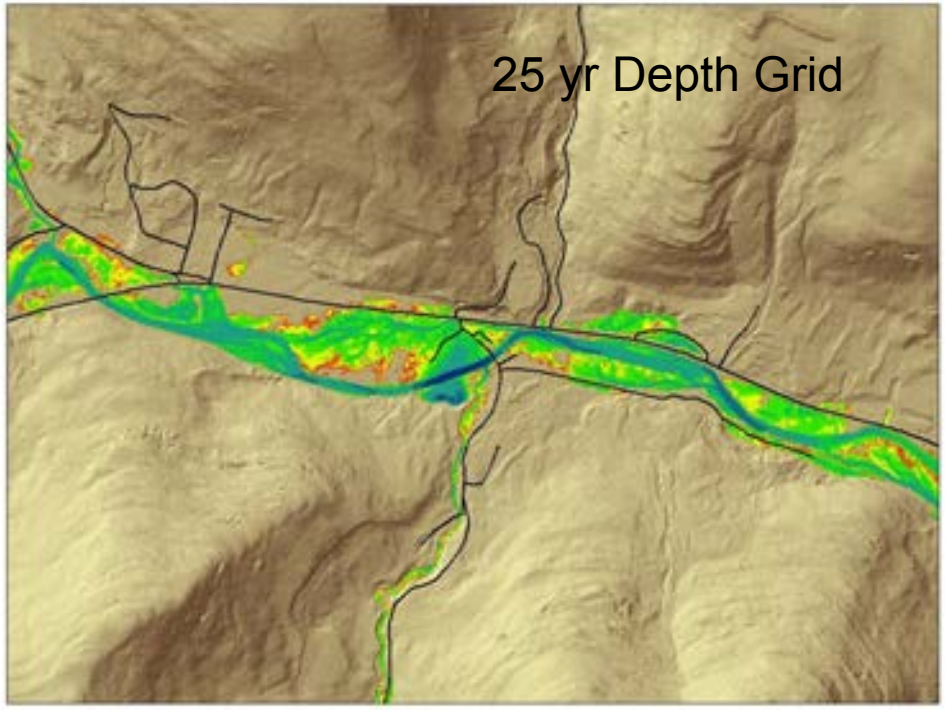
Table 2: Summary of discharges developed using statistical (LP3) analysis at USGS Gages

USGS GAGE	Peak Count	DA_Sq.Mi	Q10_CFS	Q25_CFS	Q50_CFS	Q100_CFS	Q500_CFS
013621955 (Birch Creek at Big Indian, NY)	13	12.5	1366	1912	2377	2892	4302
01362200 (Esopus Creek at Allaben NY)	49	63.7	11010	16870	22410	29090	50100
01362370 (Stone Clove Creek Below Ox Clove at Chichester NY)	15	30.9	11670	16080	19910	24230	36510
01362497 (Little Beaver Kill at Beechford near Mt Tremper NY)	14	16.5	2431	3075	3599	4161	5643
01362500 (Esopus Creek at Coldbrook NY)	80	192	39040	57340	73920	93260	151000
01363382 (Bush Kill below Malby Hollow Brook at West Shokan NY)	11	16.2	4261	5973	7511	9302	14660
01362197 (Bushnellsville Creek at S					859	3254	5880
01362342 (Hollow Tree Brook at Lan					665	849	1416

Emergency Response

- Using depth grids in the Emergency Operations Center along with the evacuation plan lets you decide when you need to evacuate residents and close facilities/roads



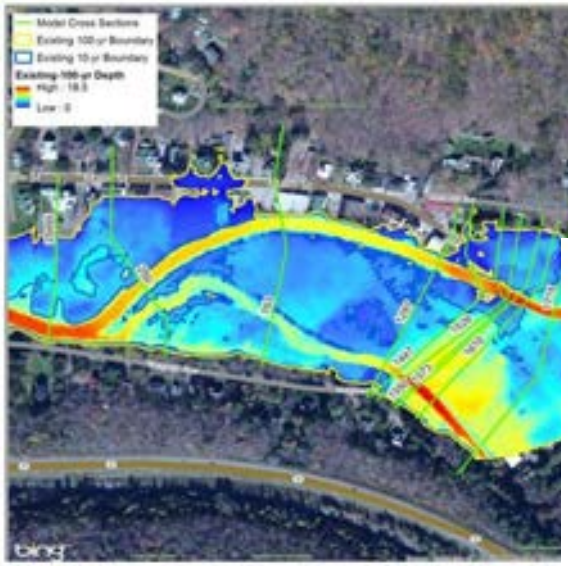


Flood Hazard Mitigation Applications

- Depth grids are useful for determining and illustrating the effect of mitigation alternatives

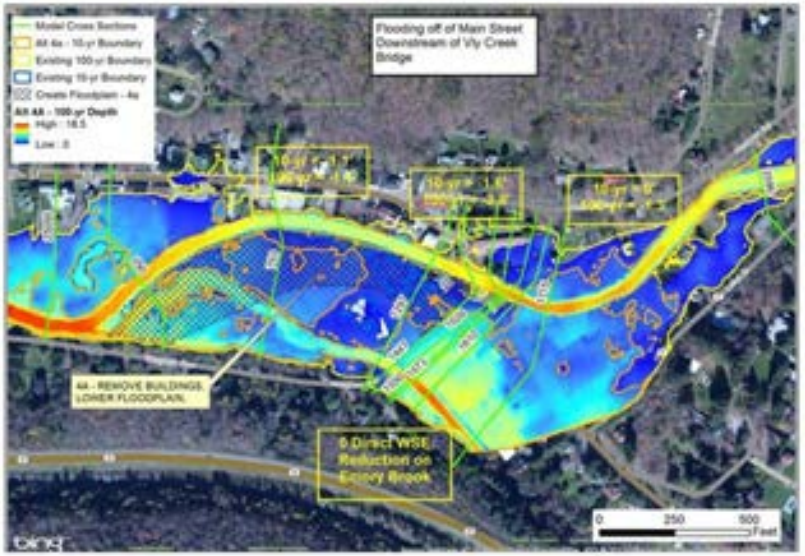
4a. Floodplain Enhancement at Vly near Confluence

Current depths



4a. Floodplain Enhancement at Vly near Confluence

Depths after floodplain project



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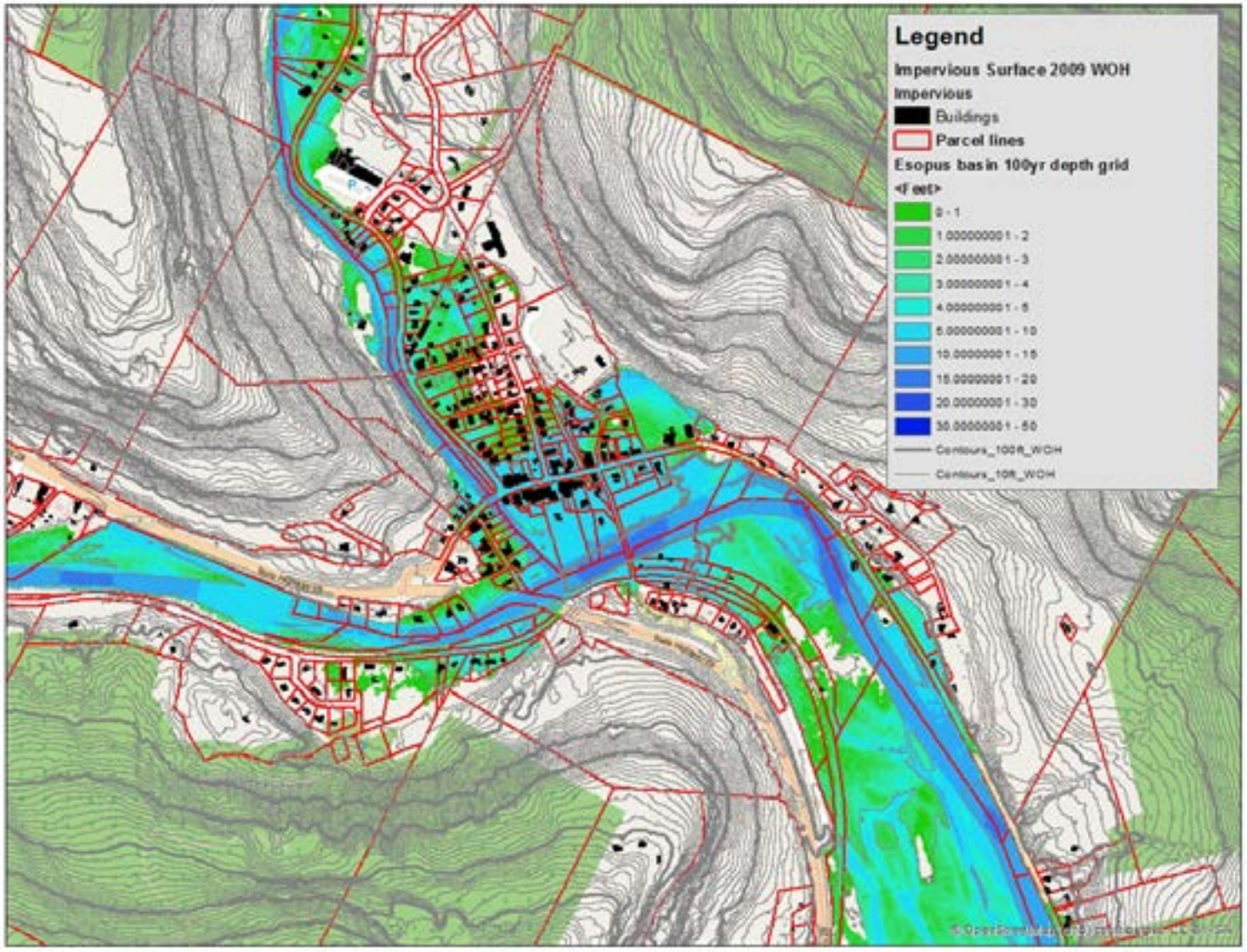
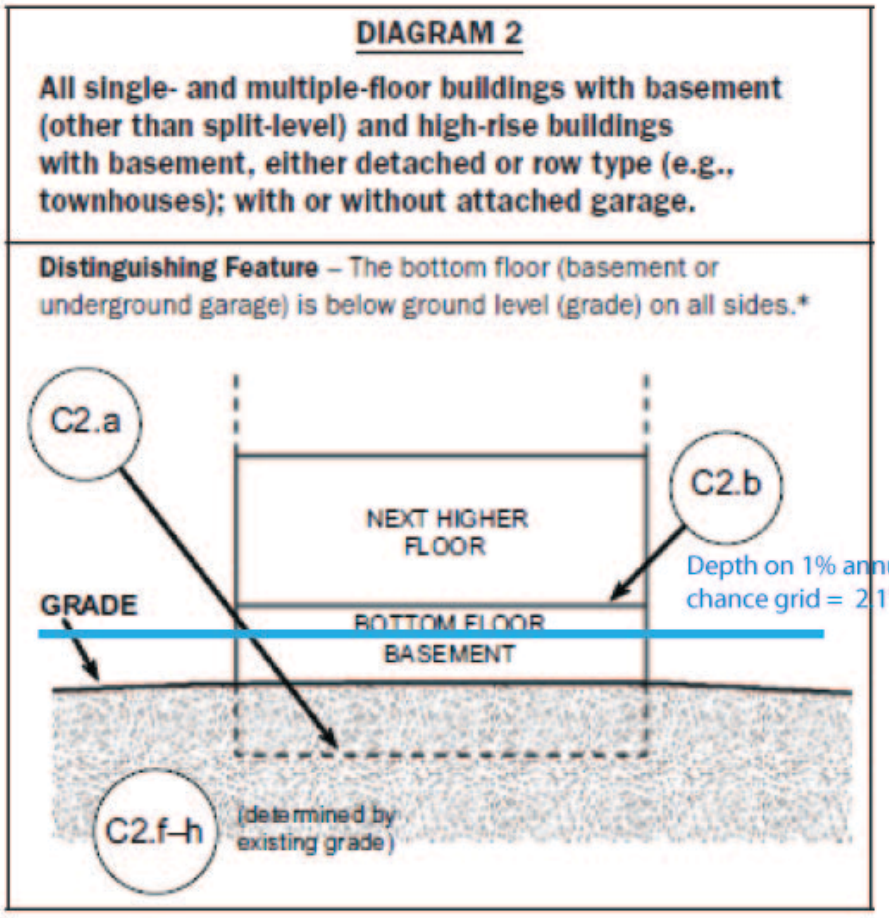
Flood Hazard Mitigation Applications

- Depth grids can be used to identify where to prioritize mitigation



Flood Buyout vs Floodproofing vs Elevation

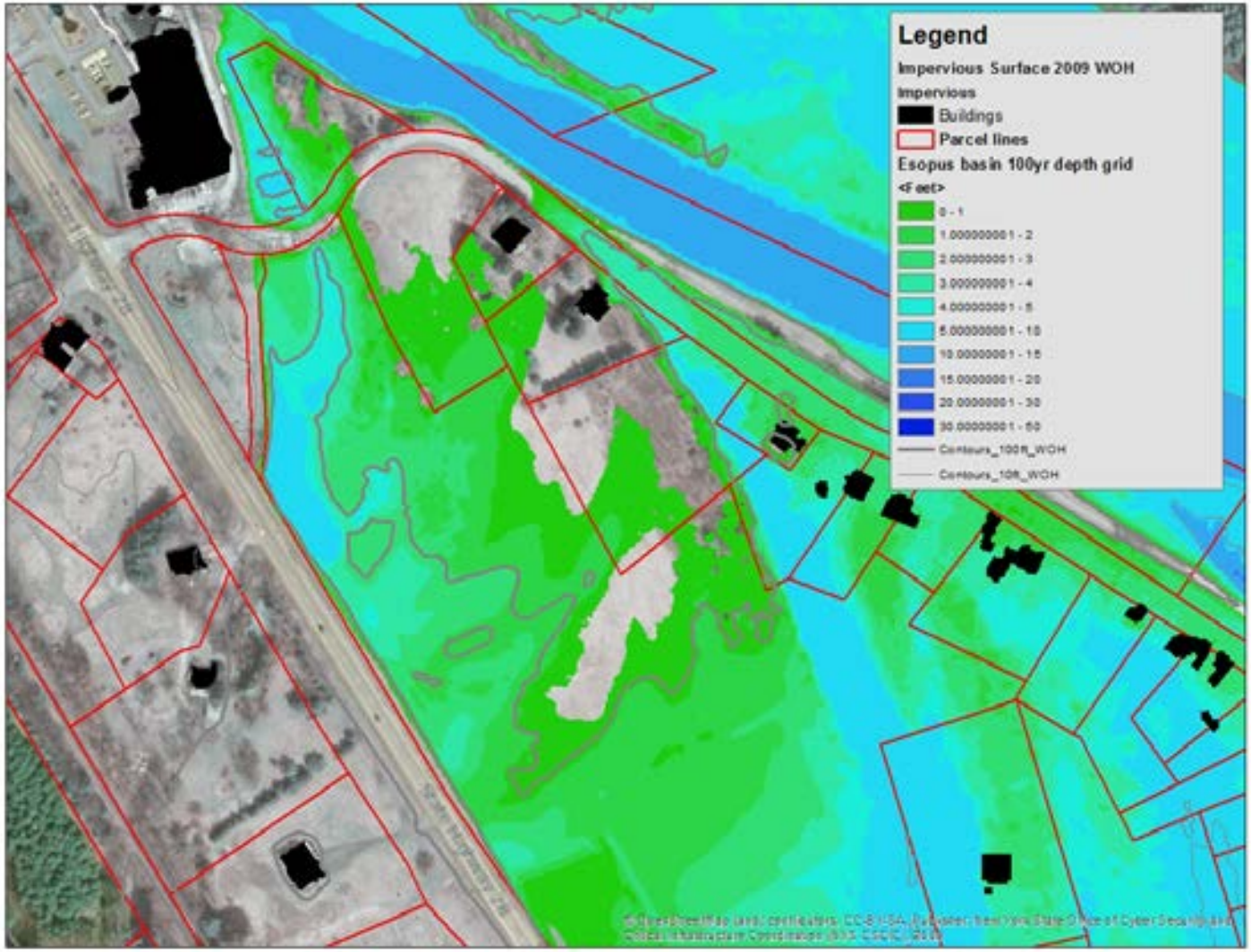
Flood Buyout vs. Floodproofing vs. Elevation



What are your options if C2.b is 3 ft. above grade?

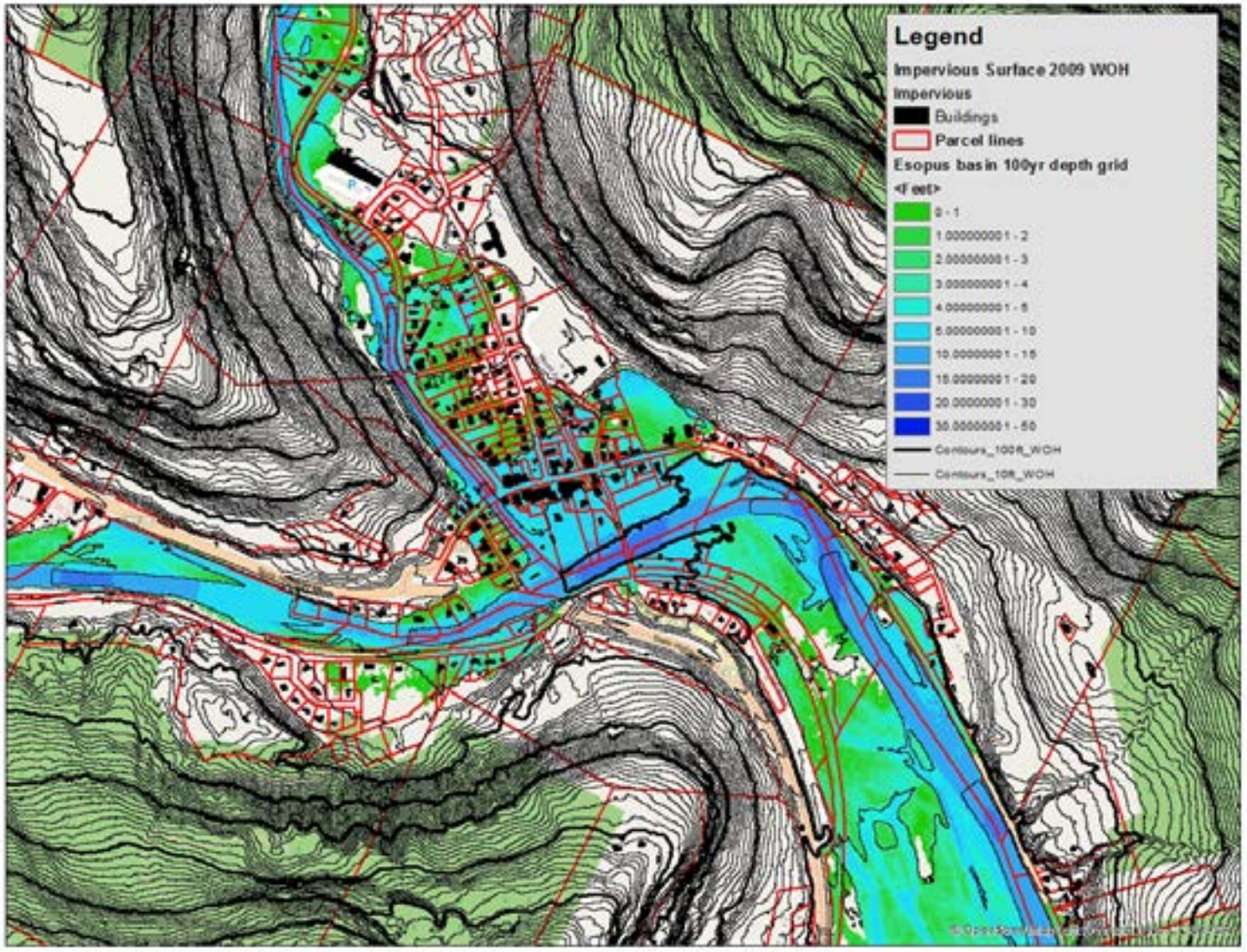
Planning Applications

- Depths grids can be a data set to be consulted as the Planning Board considers applications



Planning Applications

- Depth Grids are also useful for Comprehensive Plan reviews and updates



Limitations of Depth Grids

- Approximate with error due to LiDAR especially in mountainous terrain
- Approximation based on hydrology – climate change and accuracy of hydrology
- More accurate for the Base Flood (1% annual chance or 100 year) due to the level of QAQC of the AE zone map.
- Based on a 1 D model and therefore the flow route is not incorporated
- Use with caution.

Contact Information

- Contact for data:
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  - ddempsey@dep.nyc.gov