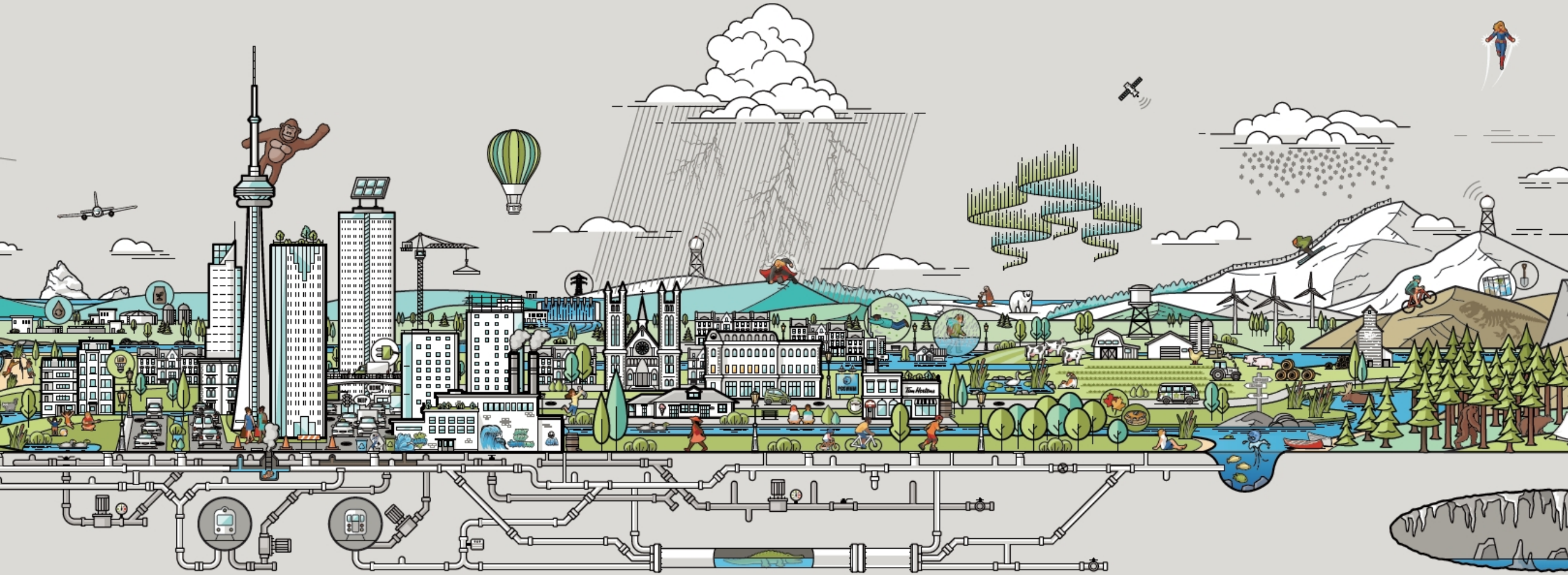
# StormCity

Computational Hydraulics Inc.



# 도시침수모델의 미래: StormCity

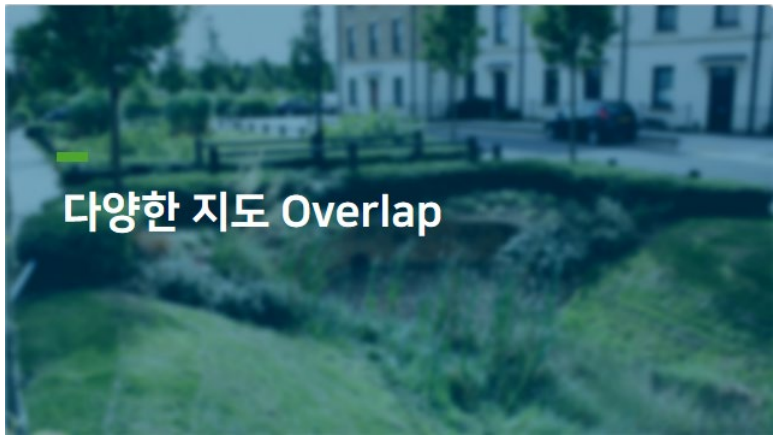
지금까지의 도시침수모델은 1, 2차원 분석을 통한 각종 설계에 집중되어 왔습니다. 그러나, 극심한 기후 재난으로 인해 제 아무리 설계에 만전을 기하여도 갑작스런 국지적 폭우에 대비하기에는 역부족임을 누구나 인정합니다.

이제, 날씨 예보 하듯이 실시간 레이더 강우를 활용하여 어디가, 언제, 얼마나 침수될 것인지 사전에 알려주어 피해를 최소화할 필요가 생겼습니다.

**PCSWMM + AI + Cloud Service**로,
모두의 안전을 지킬 수 있습니다!

# Why StormCity?









PCSWMM

# PCSWMM 파일 업로드

PCSWMM 2024 Professional 2D -- GN_risk

파일 프로젝트 지도 테이블 그래프 프로필 세부 정보 상태 문서 스크립트 속성 노트

계획 저장 압축 실행 메뉴 인쇄 열기 닫기 변경 가져오기 내보내기 선택 편집 추가 줄자 확대/축소 찾기 도구 랜더링 재생 Earth 범위 이전 다음 붙여넣기 자르기 복사 삭제 즐겨찾기 검색 추가 붙여넣기 삭제

시뮬레이션 옵션
기후
강우
단면
시계열

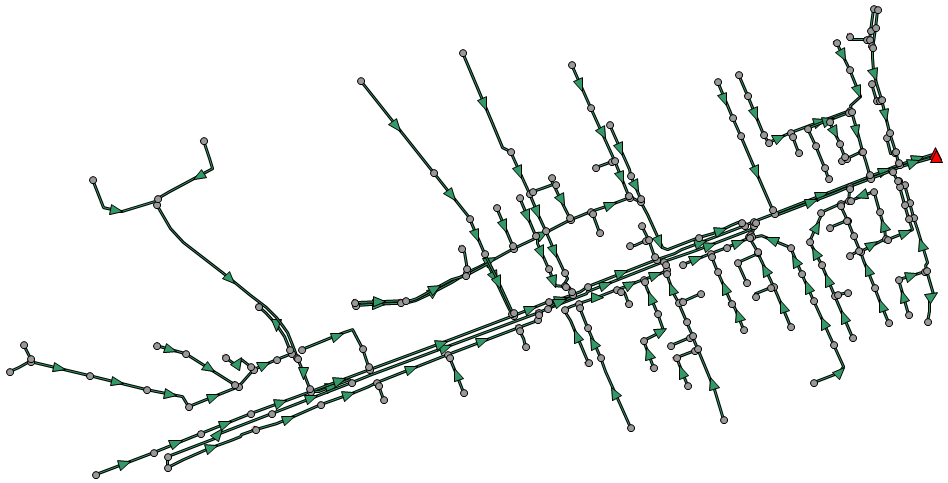
레이어

- 2D Nodes
- 절점
- 방류구
- 분배기
- 저류지
- 관
- 2D cells
- 오리피스
- 펌프
- 웨어
- 유출구
- 소유역
- GN_building
- ARM 소유역
- GN_bounding
- GN_dem

없음

프로젝트 노트

설명



자동 길이 끄기 옵셋: 깊이 CMS SWMM5.2.4 Korean 1985 Modified Central Belt ... X: 206148.459m Y: 443720.794m 월류 유출: 0% 라우팅: 0% 오래된 결과

# Project Explorer

My Projects | Shared with Me


서울 강남 재해도 Open


서울 강남 침수분석 Open


청주 무심천 주변 2D 분석 Open


Example Project Open

## 서울 강남 재해도

Created a month ago by Jin Kim (689.7 MB)

**Scenarios**

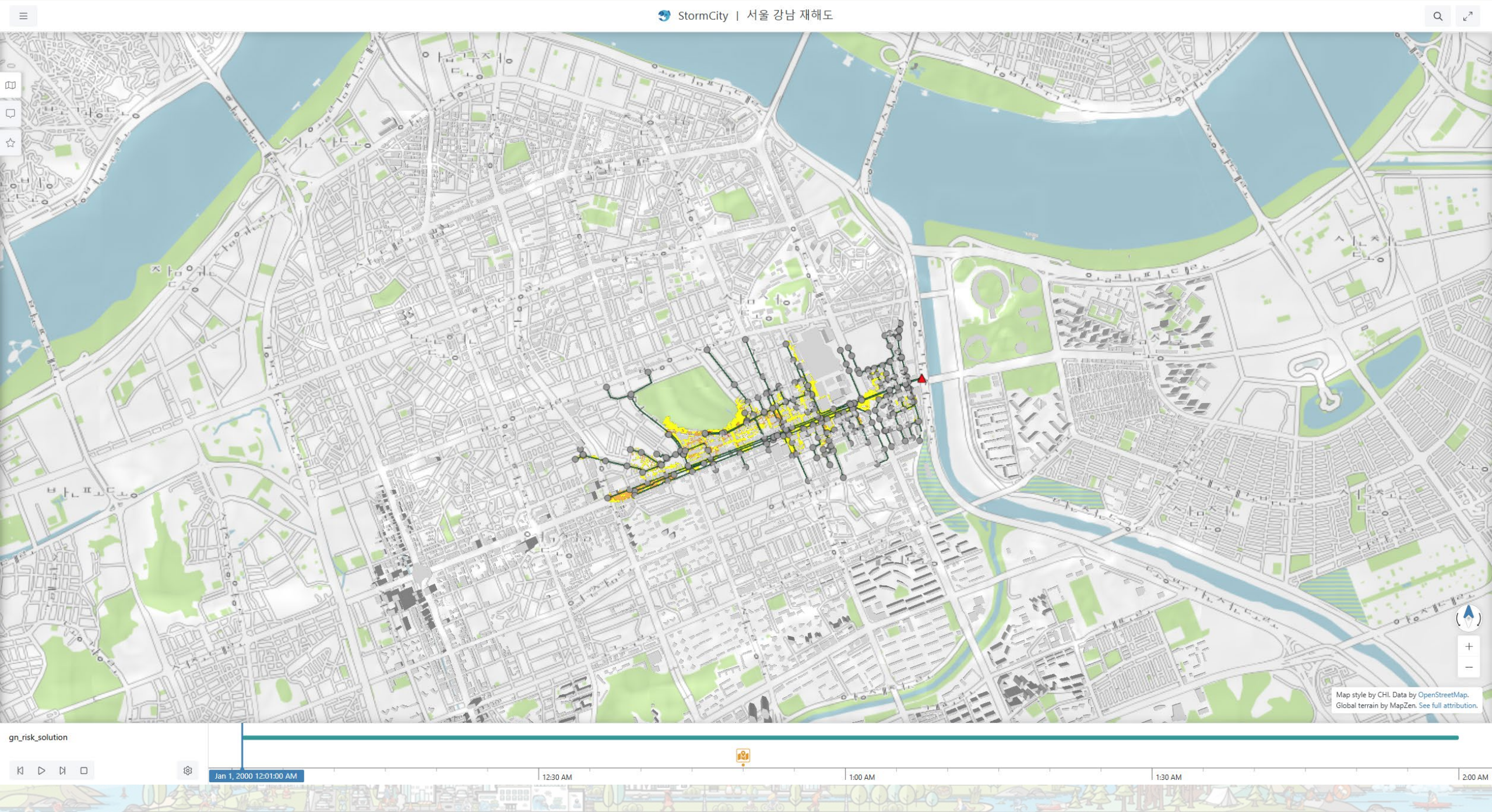
gn_risk_solution — Open Scenario

| Models / Layers | Date | Details | Size |
|---|---|---|---|
| GN_risk_final | Jan 1, 1970 9:00 AM | 37,057 entities<br>120 timesteps | 617.2 MB |
| RiskMap | Nov 1, 2024 1:11 PM | Type: SHP<br>3 multipolygons | 522.6 KB |
| 2D Nodes | Nov 1, 2024 1:11 PM | Type: SHP<br>10350 points | 2.2 MB |
| GN_bounding | Nov 1, 2024 1:11 PM | Type: SHP<br>1 polygon | 2.2 KB |
| GN_building | Nov 1, 2024 1:11 PM | Type: SHP<br>3556 polygons 2 parts | 3.1 MB |
| GN_dem | Nov 1, 2024 1:11 PM | 545.4 hectares | 12.0 MB |

**Project Layers**

| Name | Date | Details | Size |
|---|---|---|---|
| Tilemap Layer Update | Nov 1, 2024 1:19 PM | 556 hectares | N/A |
| Building Layer Update | Nov 1, 2024 1:13 PM | 13,858 buildings<br>4,592 FVA total | 21.6 MB |
| Favorites | | 4 items | |
| Pins | | 1 item | |

**Shares**


StormCity | 서울 강남 재해도
Map style by CHI. Data by OpenStreetMap.
Global terrain by MapZen. See full attribution.
gn_risk_solution
Jan 1, 2000 12:01:00 AM
12:30 AM
1:00 AM
1:30 AM
2:00 AM


과업 소개 PT

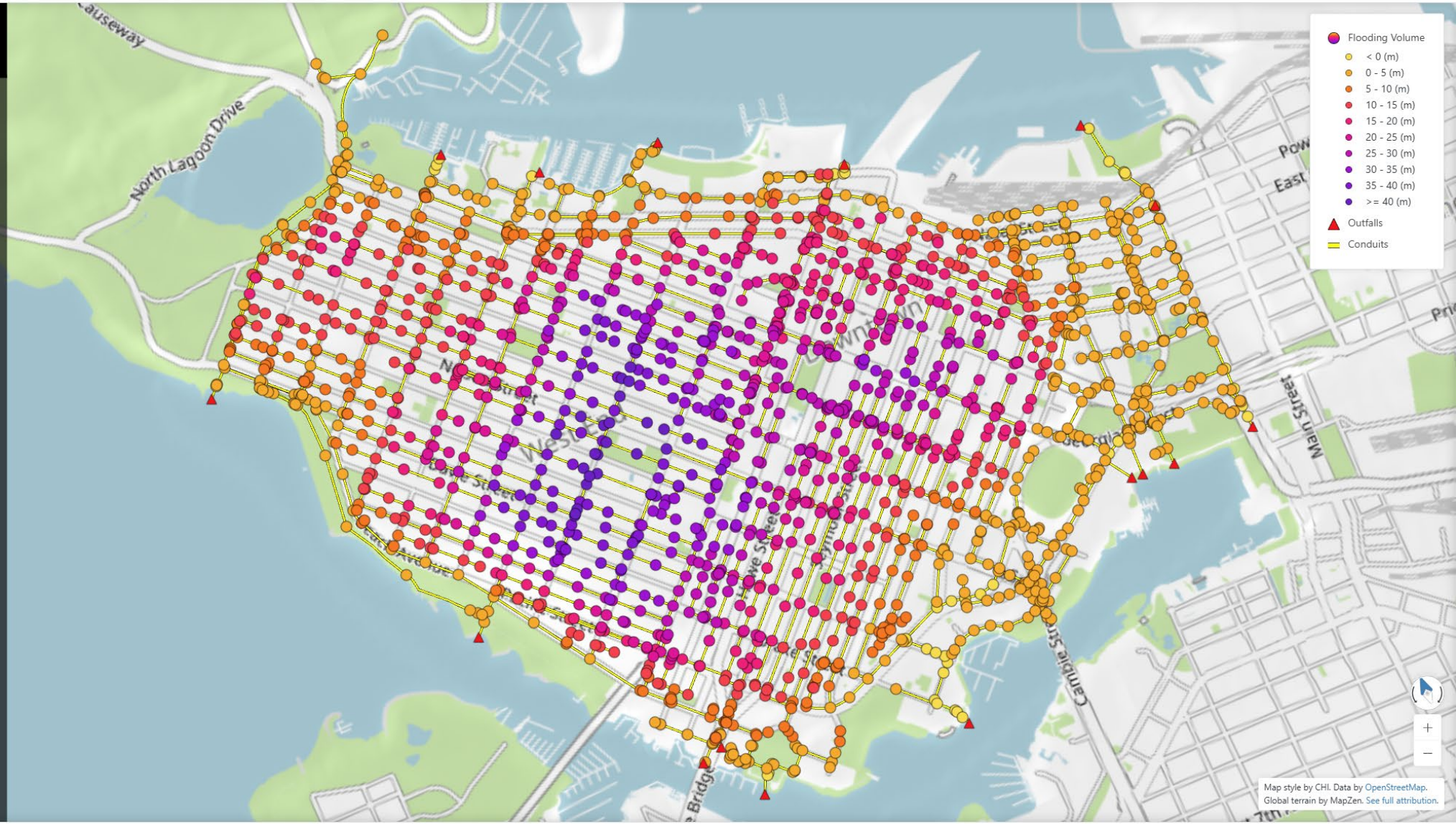

StormCity
Clear Overlay
1/33
Welcome to StormCity!
Advance this story using the right arrow key or space bar (like PowerPoint)

# Data QA/QC

In this view, the map rendering is used to check the invert elevation attributes of all junctions in the model.

Models can be uploaded to StormCity while they are being built in order to share progress, solicit feedback or markup from colleagues or clients, and QA/QC the model data in 3D.

The rendering setups stored in favorites can be switched between almost instantly, even in very large (100,000+ pipes) models.




# 다양한 지도 Overlap

# Background Layers

Background layers in Shapefile (.shp) format are supported.

A polygon layer has been rendered here to show parcels affected by surface flooding.

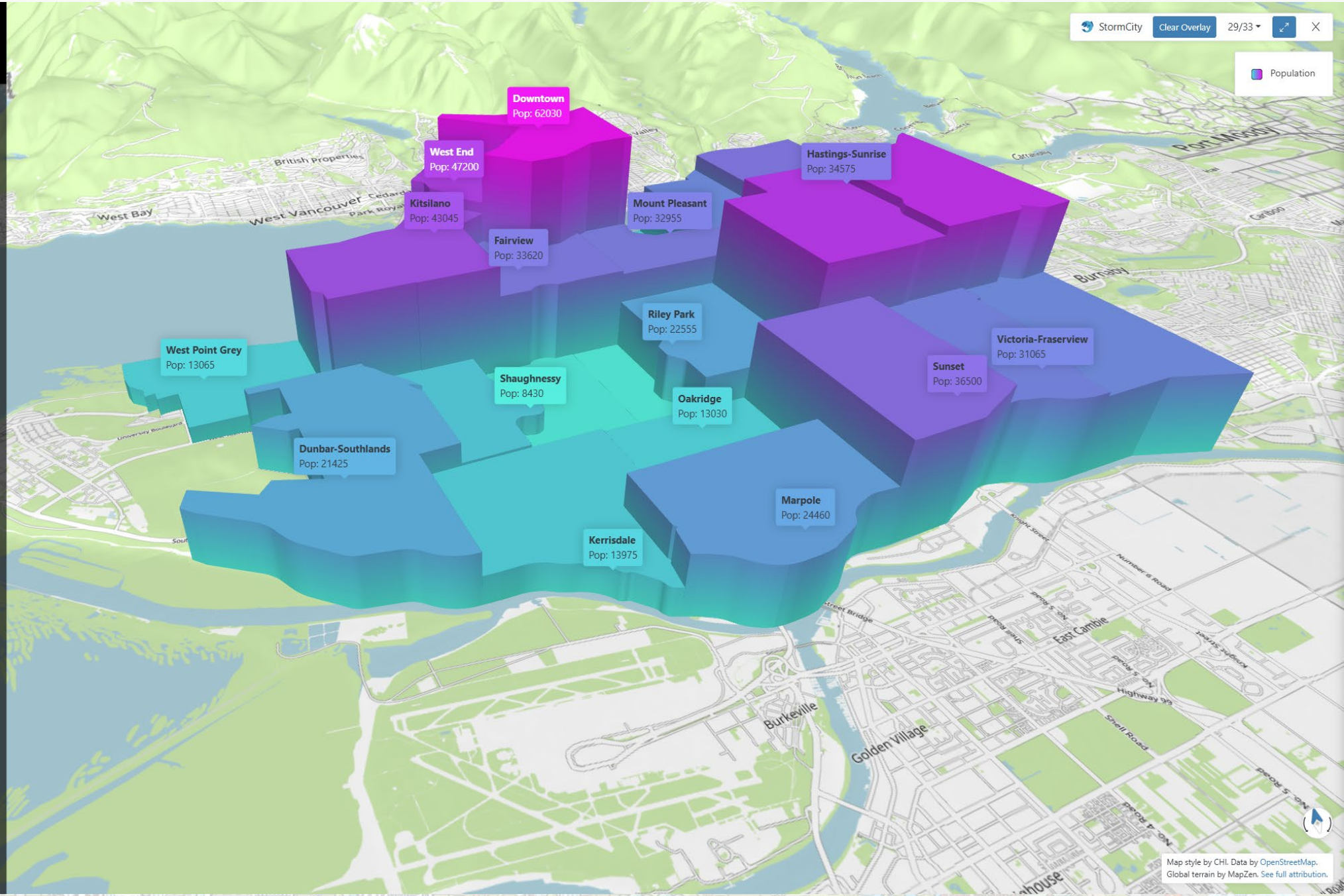
# 2D Flood Visualization

Alternatively, you can use static or dynamic isopleths to visualize depth, velocity or create risk maps.

# Extruded Polygons

Polygon layers can be extruded based on their attributes. In this example, Vancouver neighbourhoods are extruded up to 2,000 meters based on their populations. A continuous gradient has been applied to the shapes.

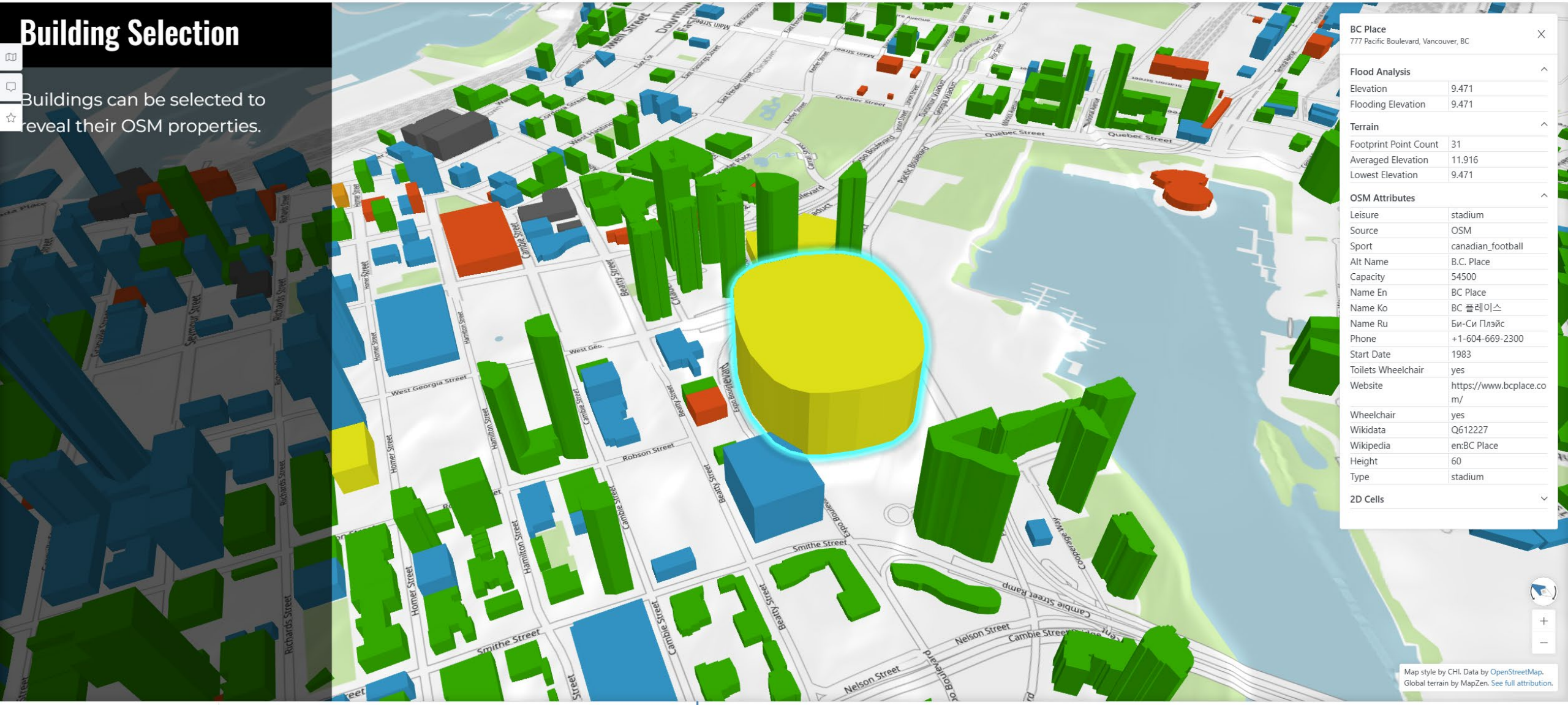
Custom HTML formatted labels can be placed overtop, automatically matching the color and pulling in the corresponding value.




StormCity | 서울 강남 재해도
©2024 Google. Global terrain by MapZen. See full attribution.
gn_risk_solution
Jan 1, 2000 12:01:00 AM
12:30 AM
1:00 AM
1:30 AM
2:00 AM

# Building Selection

Buildings can be selected to reveal their OSM properties.




**BC Place**
777 Pacific Boulevard, Vancouver, BC

| Flood Analysis | |
|---|---|
| Elevation | 9.471 |
| Flooding Elevation | 9.471 |

| Terrain | |
|---|---|
| Footprint Point Count | 31 |
| Averaged Elevation | 11.916 |
| Lowest Elevation | 9.471 |

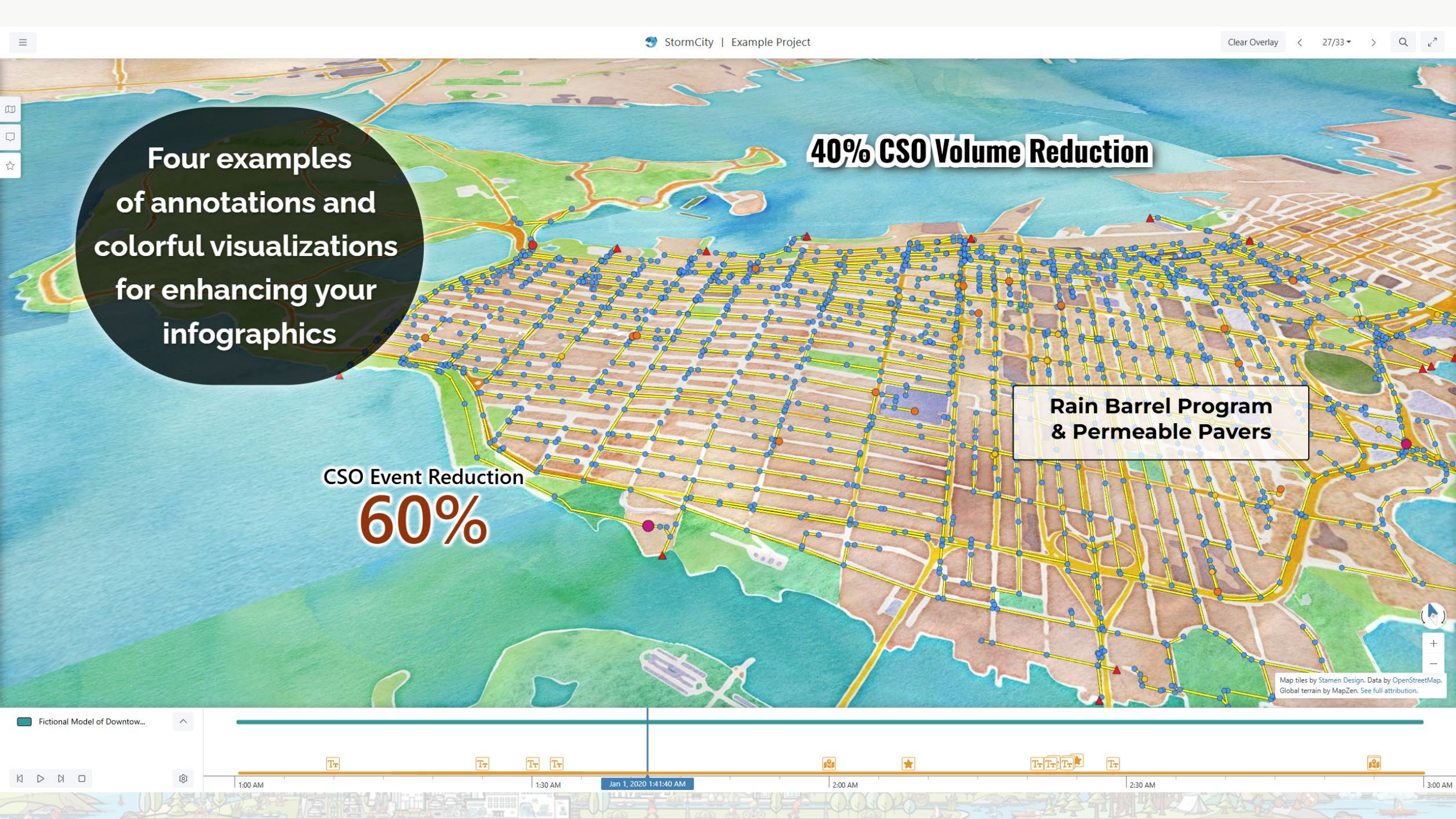
| OSM Attributes | |
|---|---|
| Leisure | stadium |
| Source | OSM |
| Sport | canadian_football |
| Alt Name | B.C. Place |
| Capacity | 54500 |
| Name En | BC Place |
| Name Ko | BC 플레이스 |
| Name Ru | Би-Си Плэйс |
| Phone | +1-604-669-2300 |
| Start Date | 1983 |
| Toilets Wheelchair | yes |
| Website | https://www.bcplace.com/ |
| Wheelchair | yes |
| Wikidata | Q612227 |
| Wikipedia | en:BC Place |
| Height | 60 |
| Type | stadium |

2D Cells



Fictional Model of Downtow...

1:00 AM | 1:30 AM | Jan 1, 2020 1:41:40 AM | 2:00 AM | 2:30 AM | 3:00 AM

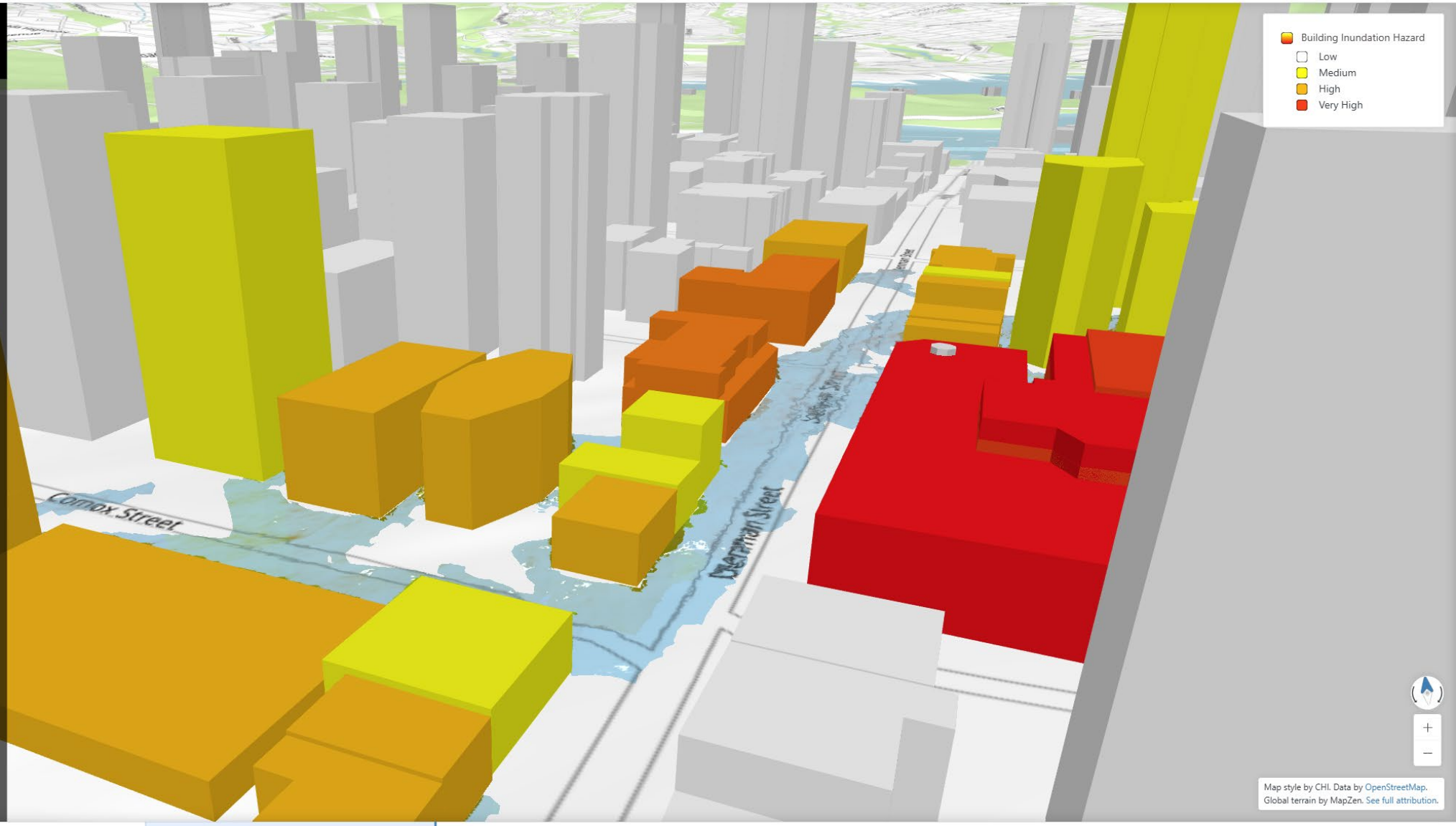

StormCity | Example Project
Clear Overlay
27/33
Four examples of annotations and colorful visualizations for enhancing your infographics
40% CSO Volume Reduction
Rain Barrel Program & Permeable Pavers
CSO Event Reduction
60%
Map tiles by Stamen Design. Data by OpenStreetMap.
Global terrain by MapZen. See full attribution.
Fictional Model of Downtow...
1:00 AM
1:30 AM
Jan 1, 2020 1:41:40 AM
2:00 AM
2:30 AM
3:00 AM


입체적인 결과 표현

# Building Rendering

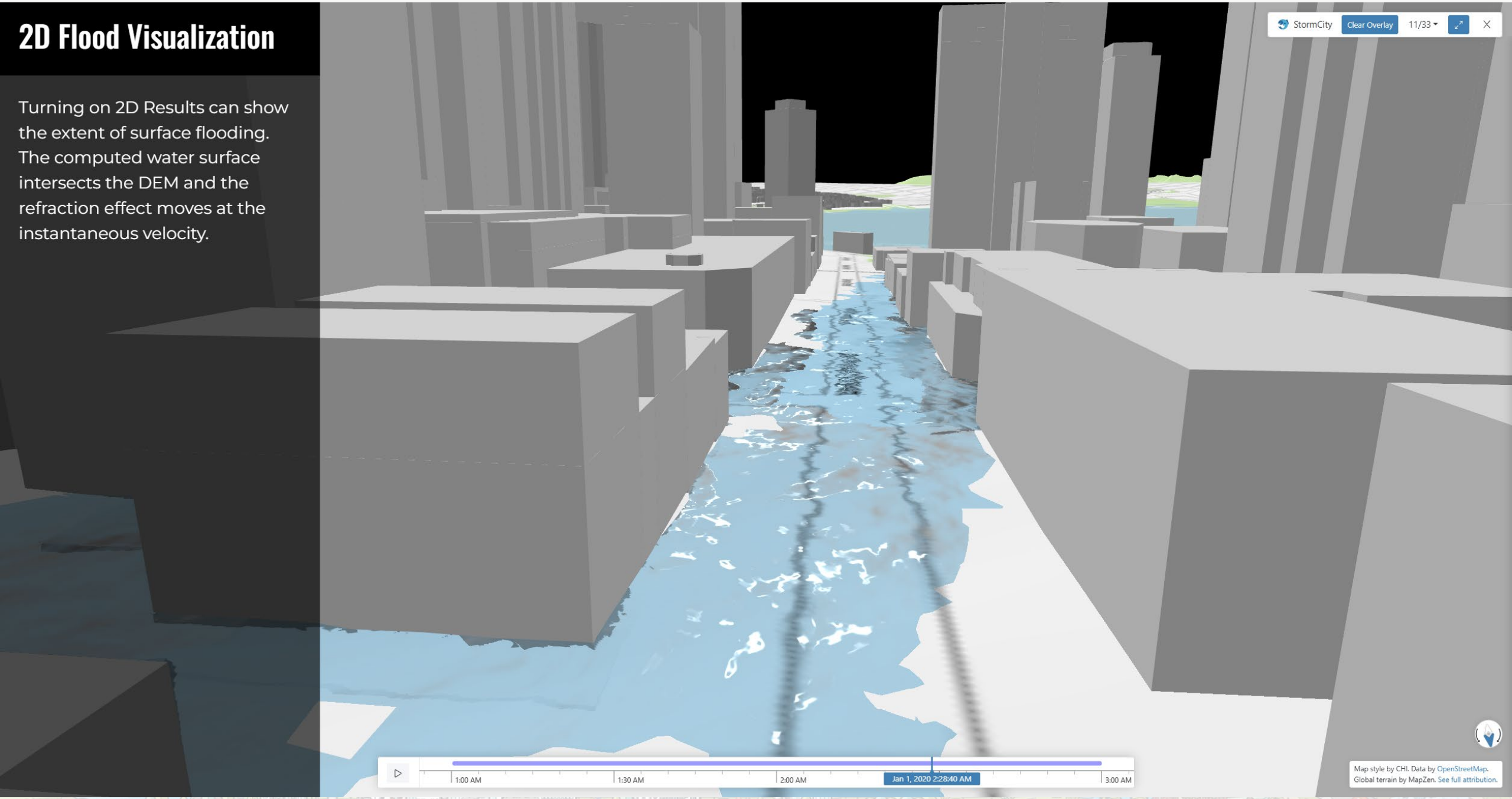
In this favorite, the impact of surface flooding on buildings is visualized with a color gradient.

Feel free to zoom around the map and resume the story by pressing the right arrow key, spacebar, or selecting the desired favorite from the presentation toolbar in the top right.



# 2D Flood Visualization

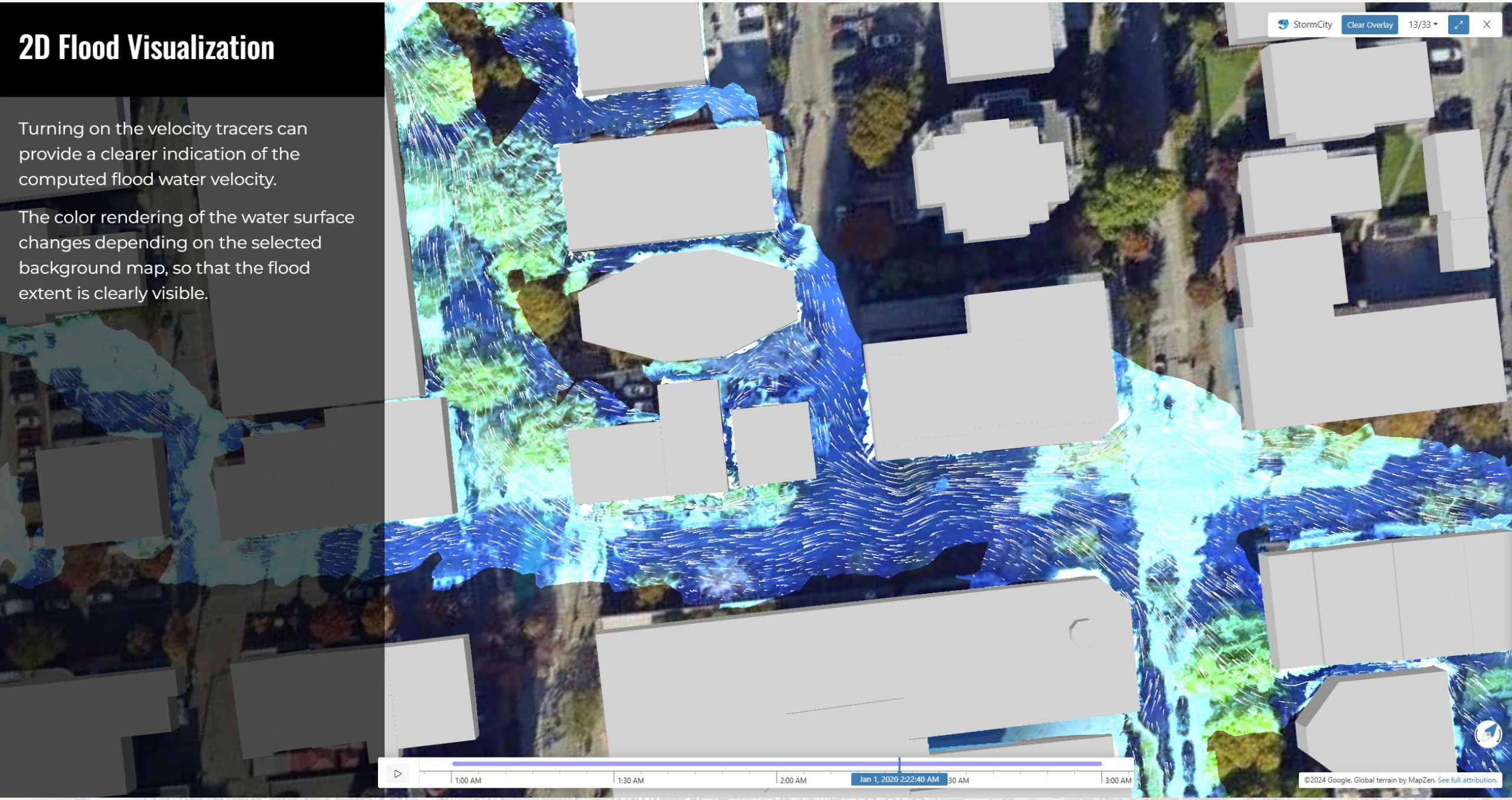
Turning on 2D Results can show the extent of surface flooding. The computed water surface intersects the DEM and the refraction effect moves at the instantaneous velocity.



# 2D Flood Visualization

Turning on the velocity tracers can provide a clearer indication of the computed flood water velocity.

The color rendering of the water surface changes depending on the selected background map, so that the flood extent is clearly visible.



## Map State

Layers

- SWMM
  - Junctions
  - Outfalls
  - Conduits
  - Orifices
  - Subcatchments
  - 2D mesh
- GN_bounding
- GN_building
- 2D Nodes
- RiskMap

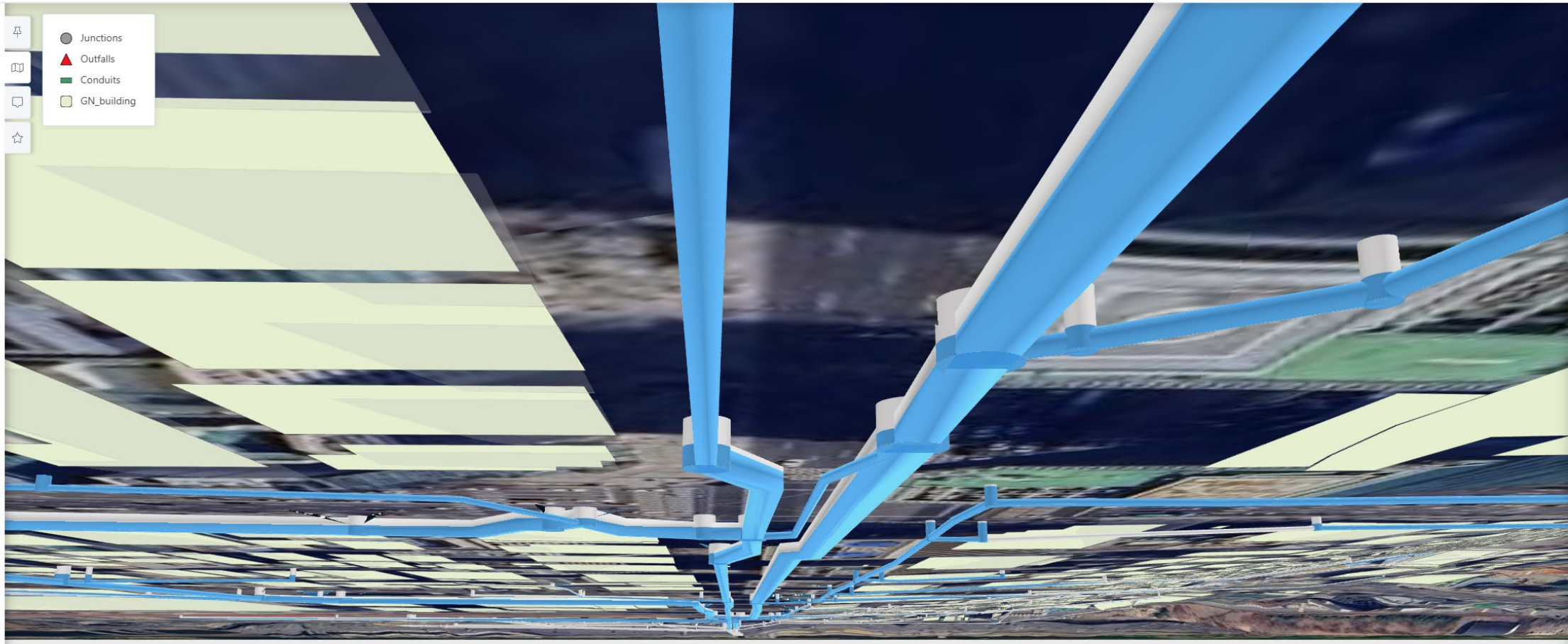
Legend: Top Left

Flooding: Tracer

Pins: None

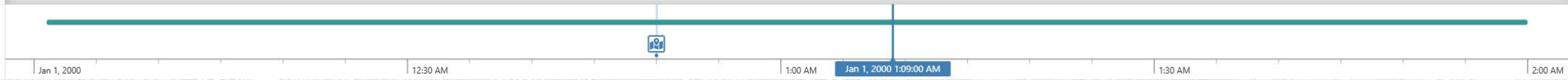
Buildings: Translucent

Tilemap: Satellite






gn_risk_solution

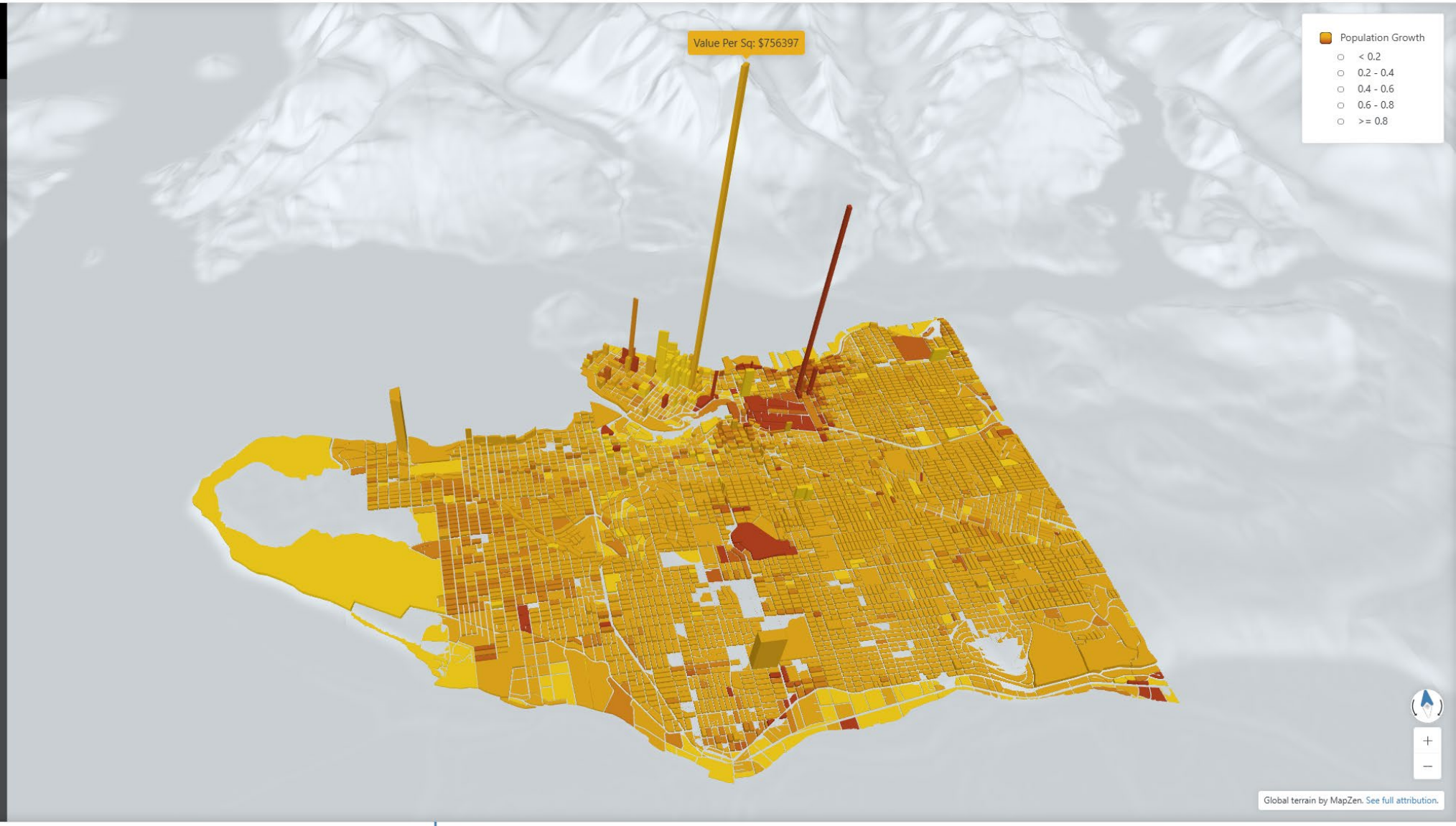



사진, 영상, 데이터 연결


StormCity | 서울 강남 재해도
Junctions
Outfalls
Conduits
RiskMap
보이기
저위험
중위험
고위험
20
10
0
Flow (m³/s)
Jan 1
1 am
2 am
Conduit L01-03
테헤란로 메인 관로 상황
Map tiles by Stamen Design. Data by OpenStreetMap.
Global terrain by MapZen. See full attribution.
gn_risk_solution
Jan 1, 2000 12:01:00 AM
12:30 AM
1:00 AM
1:30 AM
2:00 AM

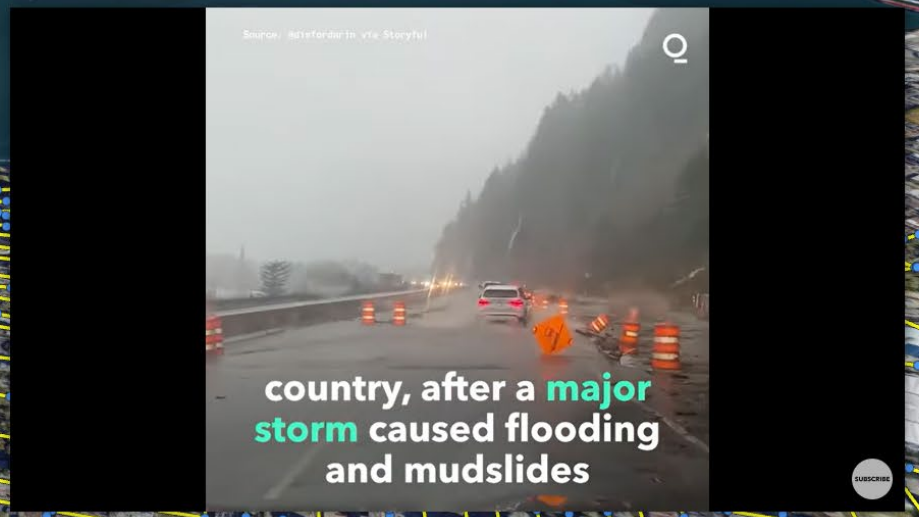
# Extruded Polygons

In this example, parcels are colored according to property value and extruded according to population growth.




# Video Examples

Videos from a variety of sources can be embedded in StormCity, including live video feeds useful for real-time modeling applications.

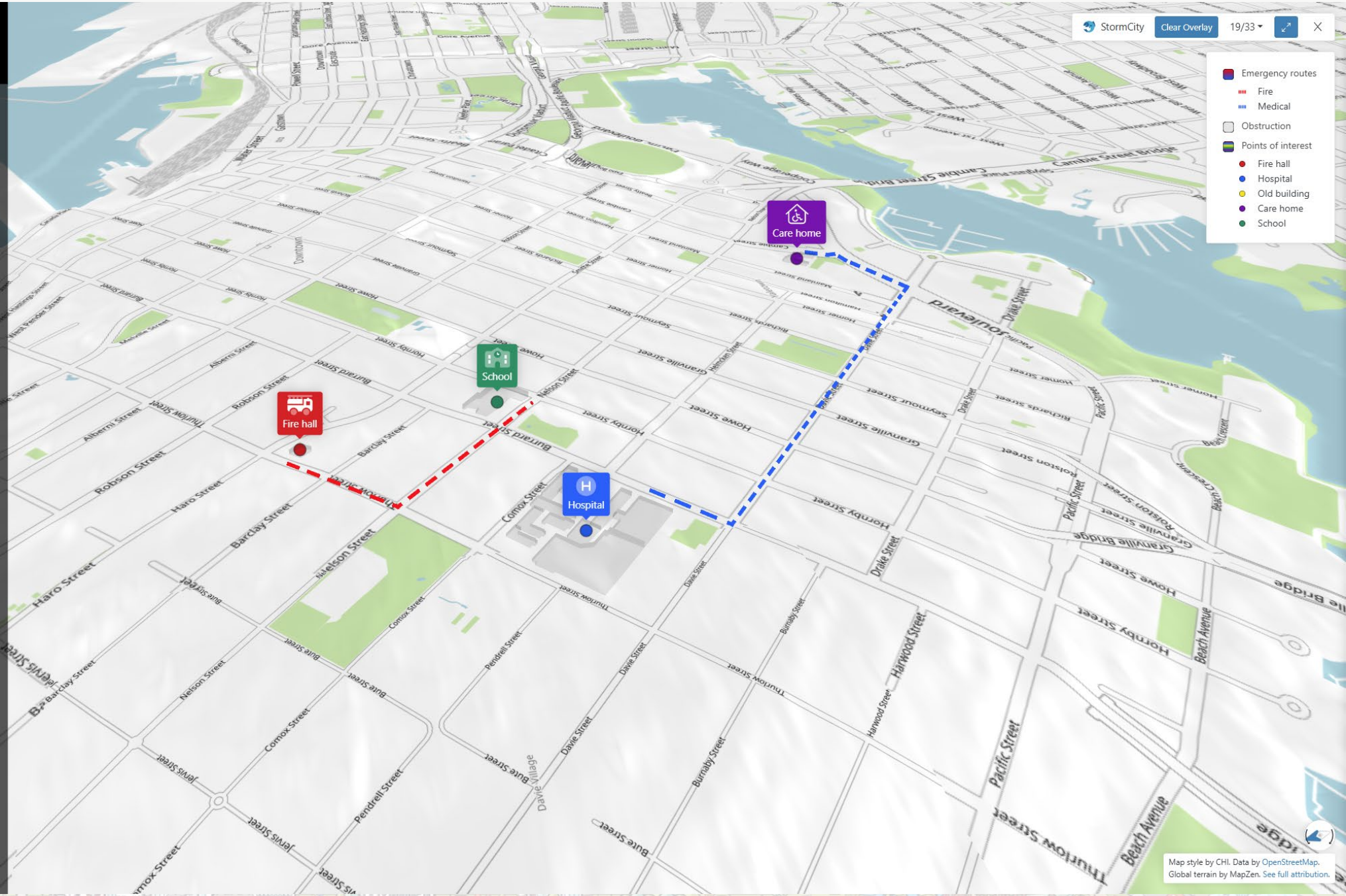



# 침수 예·경보

# Emergency Routes

In this favorite, lines, points and polygons are used together to query and highlight points of interest and animate the emergency transportation routes between them.

Labels and icons are included to provide more context.




**Conduit L01-03**



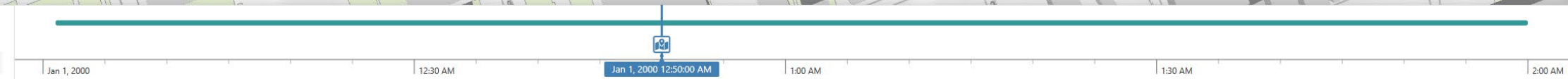

**Attributes**

| | |
|---|---|
| Name | L01-03 |
| Inlet Node | A01-02 |
| Outlet Node | A01-03 |
| Description | |
| Tag | |
| Length (m) | 526 |
| Roughness | 0.015 |
| Inlet Offset (m) | 0 |
| Outlet Offset (m) | 0 |
| Initial Flow ($m^3/s$) | 0 |
| Flow Limit ($m^3/s$) | 0 |
| Entry Loss Coeff. | 0 |
| Exit Loss Coeff. | 0 |
| Avg. Loss Coeff. | 0 |
| Seepage (mm/hr) | 0 |
| Flap Gate | NO |
| Cross-Section | RECT_CLOSED |
| Geom1 (m) | 2 |
| Geom2 (m) | 3 |
| Geom3 | 0 |
| Geom4 | 0 |
| Barrels | 1 |
| Transect | |
| Shape Curve | |
| Culvert Code | |
| Control Rules | NO |

**PCSWMM Results**

| | |
|---|---|
| Max. Spread (m) | 0 |
| Contributing Area (ha) | 76.947 |
| Contributing Imp. Area (ha) | 61.558 |

gn_risk_solution



# 도시침수모델의 미래: StormCity

- 지자체의 실시간 침수 예보 및 경보 시스템
- 기상청 강우 예보 레이더와 실시간 연결
- 맨홀 및 하천 수위계와 실시간 연결
- 침수 예상 시각, 지점, 침수심 표출
- 담당자 PC, 스마트폰에서도 확인
- 침수 재해 최소화 & 복구비 절감
- 대민 안전 서비스 기능 대폭 확충
- 비전문가도 빠른 이해, AI 학습 효과…

# StormCity

Computational Hydraulics Inc.

# Hydrosoft

**Think Global, Act Local**