

MONTHLY COVID ROUND-UP WITH RCLCO
CLIMATE RISK AND
REAL ESTATE INVESTING

September 17, 2020

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Moderator

AGENDA

1. Introductions
2. Overview: Climate risk in real estate investing
3. Summary of 427
4. RCLCO framework
5. Discussion and Q&A

CLIMATE RISK OVERVIEW

- ▶ According to the National Oceanic and Atmospheric Administration (“NOAA”), severe weather events in the US caused over \$80B in economic damage per year on average over the last decade
 - » Trailing 5-year average: \$107.1B
 - » Trailing 3-year average: \$153.5B
- ▶ Physical vs. Transition Risks
- ▶ Traditional mitigation efforts and tools are insufficient
 - » At the same time, Investors are increasingly requiring more sophisticated climate risk assessments
- ▶ The million dollar question – How do we price in this risk?

New Data Shows an ‘Extraordinary’ Rise in U.S. Coastal Flooding

How Climate Change Could Affect CRE Valuations Natural Disasters Cost U.S. A Record \$306 Billion Last Year

more Americans are at risk of flooding than ever before. Here’s how to address this new reality

Climate Change Is Now Driving Investments in Flood Resilience

Financial Markets and Regulators Are Still in the Dark on Climate Change

Your Climate Disaster Tax Bill Is Growing Crashing coastal property values and the economic fallout of climate change

Climate change will crush real estate values for investors who don’t prepare, new report says

Flooding

Sea Level Rise

Hurricanes

Wildfires

Extreme Heat /
Droughts



Four Twenty Seven



Climate Risk and Real Estate Investing

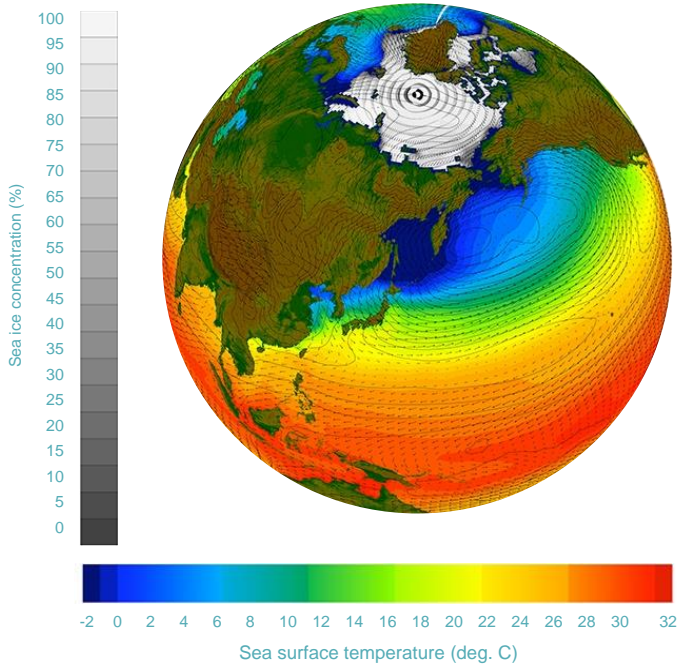
RCLCO Webinar

■ Emilie Mazzacurati

■ 9/17/2020

About Four Twenty Seven

- » Four Twenty Seven, an affiliate of Moody's, is the leading provider of data and analytics on the physical risks associated with climate change.
- » Established in 2012, we are headquartered in Berkeley, CA, with offices in Washington DC, Paris and Tokyo and representatives in London and Sydney.
- » We translate climate models into actionable intelligence for our clients, which include some of the world's largest investors, asset managers, commercial banks, development finance institutions, corporations and government agencies.



+ We Distill Volumes of Data into Actionable Views

Real Estate, Infrastructure and Corporate Locations

Asset Score Form

Facility Name:

Street Address 1:

Street Address 2:

City:


State/Province:

Postal Code:

* Country:

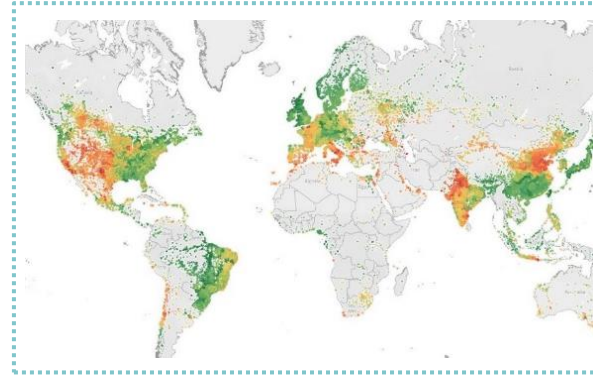
* Activity:

Latitude:



On-demand Scoring

Listed Companies and Real Estate Investment Trusts



Data Products

Municipalities and Sovereigns



Four Twenty Seven Analytics Engine

Climate & Weather Data

- » IPCC
 - » NASA
 - » European Space Agency
 - » World Meteorological Organization
 - » NOAA
 - » CLIMsystems
- 

Environmental Risk Data

- » FATHOM
 - » World Resources Institute
 - » USGS
 - » AQUEDUCT
- 

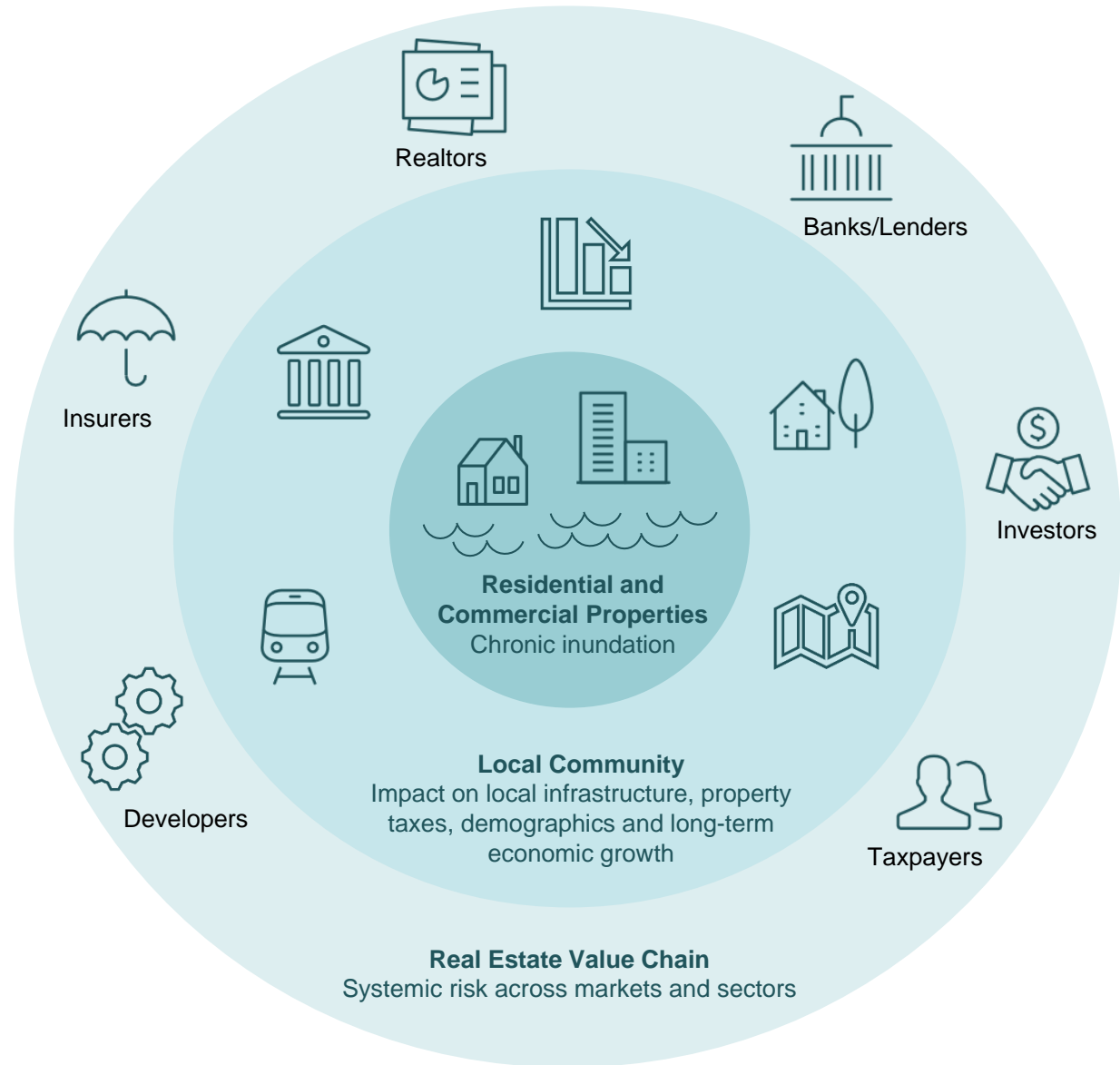
Corporate & Financial Data

- » Bureau Van Dijk
 - » REIS by Moody's Analytics
 - » FactSet
 - » GEOPHY
- 

Global Trade & Economic Data

- » World Economic Forum
 - » The World Bank
 - » UN Comtrade
 - » KGM
 - » Bureau of Economic Analysis
- 

+ Impacts of Sea Level Rise on Real Estate Markets



Source: Union of Concerned Scientists, Four Twenty Seven

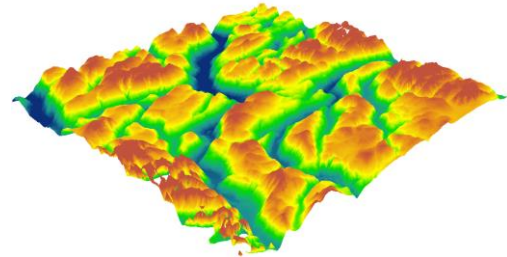


Source: The New York Times, June 19, 2020
<https://www.nytimes.com/2020/06/19/climate/climate-seas-30-year-mortgage.html>

+ Using Climate Science for Investment Decisions



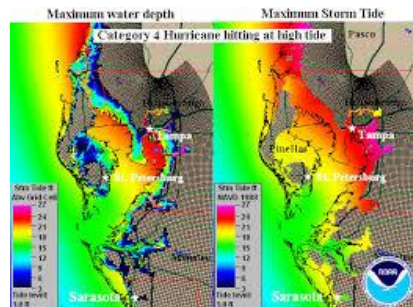
Air, ocean, and ice (including cliff) dynamics



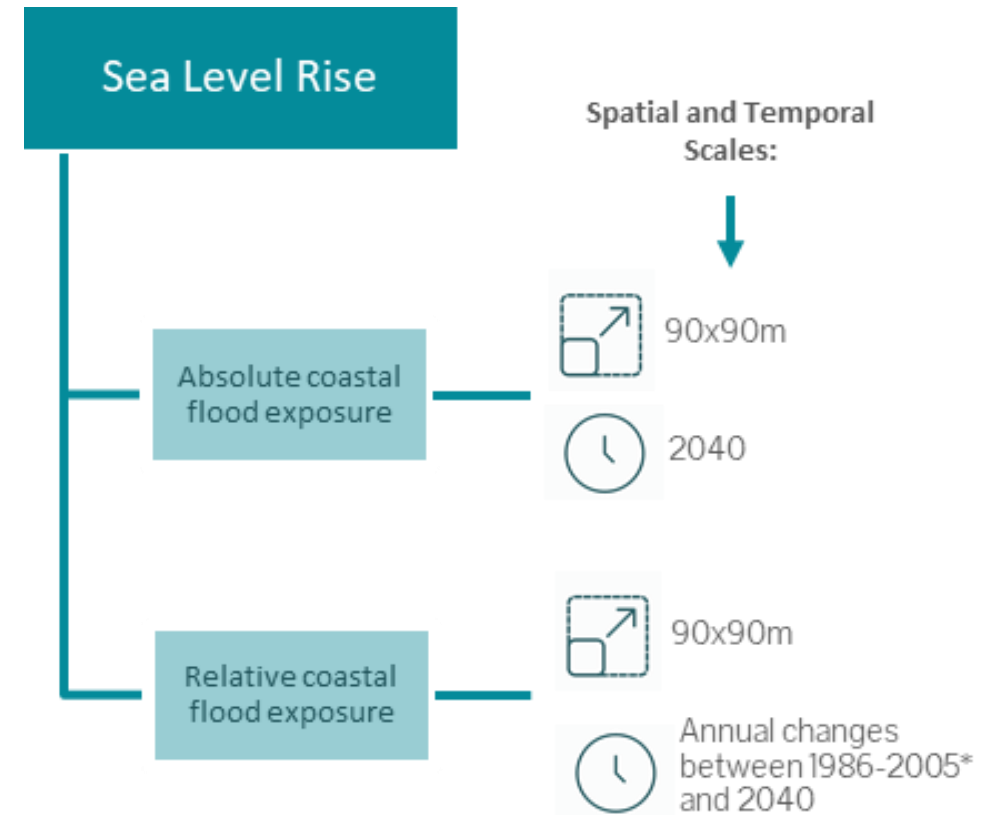
Elevation data (SRTM)



Historical sea levels and subsidence



Tidal gauge data for storm surge



Source: Four Twenty Seven



Assessing Climate Risk for a Property



Asset Scoring - Form

* Facility Name:

Street Address 1:

Street Address 2:

City:

State/Province:

Postal Code:

* Country:

* Activity:

Latitude:

Longitude:

Map Location

Calculate Score

Reset

Moody's New York Office

Scorecard

CSV

Address: 1 World Trade Center, New York, NY, USA
Coordinates: (40.71125, -74.01442) Activity: Office

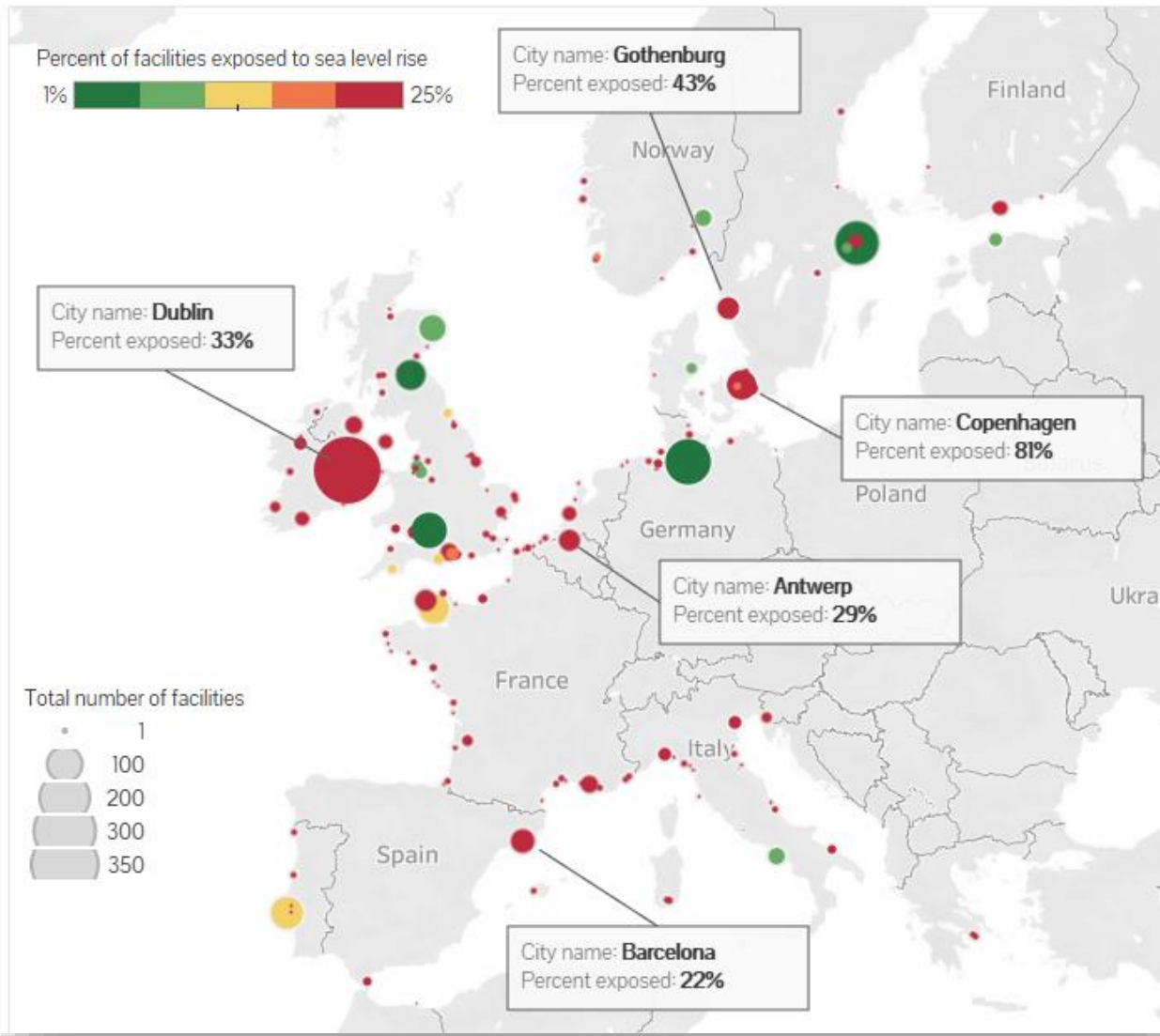
Category	Risk Level	Category Score	Country Benchmark
+ Earthquakes	None	0	22
+ Floods	Low	6	20
+ Heat Stress	High	45	45
+ Hurricanes & Typhoons	Low	39	23
- Sea Level Rise	Red Flag	80	6

Subcategory	Measure	Unit	Subcategory Score	Country Benchmark
Absolute Coastal Flood Frequency		Return Period of Inundation	100	6
Relative Coastal Flood Frequency		Factor of change	60	6
+ Water Stress			60	46
- Wildfire			43	64

Subcategory	Measure	Unit	Subcategory Score	Country Benchmark
Burnable Fuel Availability	Medium	Percent		
Change in days with high wildfire potential	0.00	Difference in high risk days	0	35
Change in maximum wildfire potential	34.97	Difference in KBDI	50	61
Days with high wildfire potential	0.00	High risk days	0	31
Maximum wildfire potential	126.48	KBDI	40	53

+ Market Exposure to Sea Level Rise

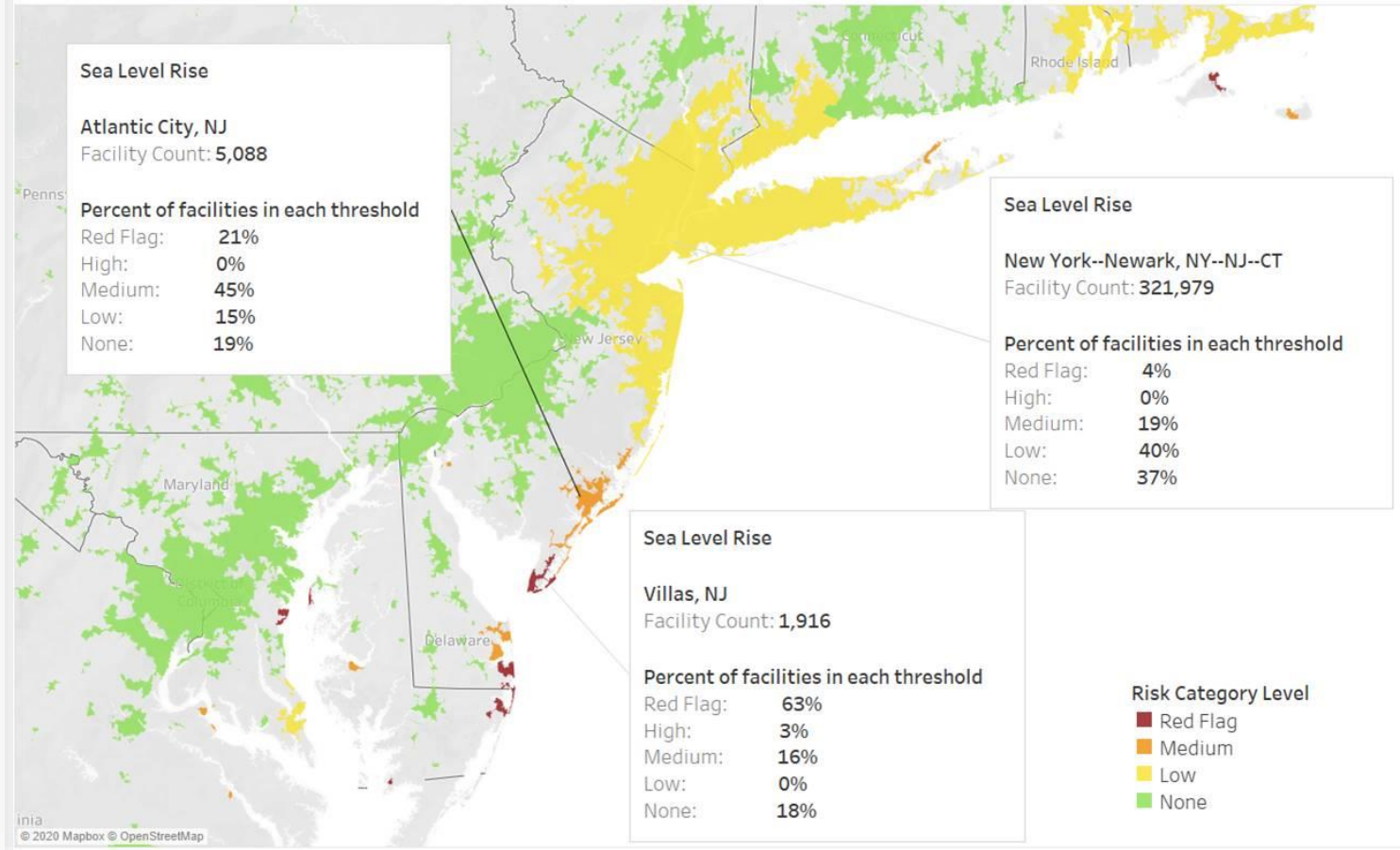
Corporate Offices - Sea Level Rise Exposure



Source: Four Twenty Seven (September 2019)

<http://427mt.com/2019/09/06/real-estate-climate-risks-how-europe-will-be-impacted/>

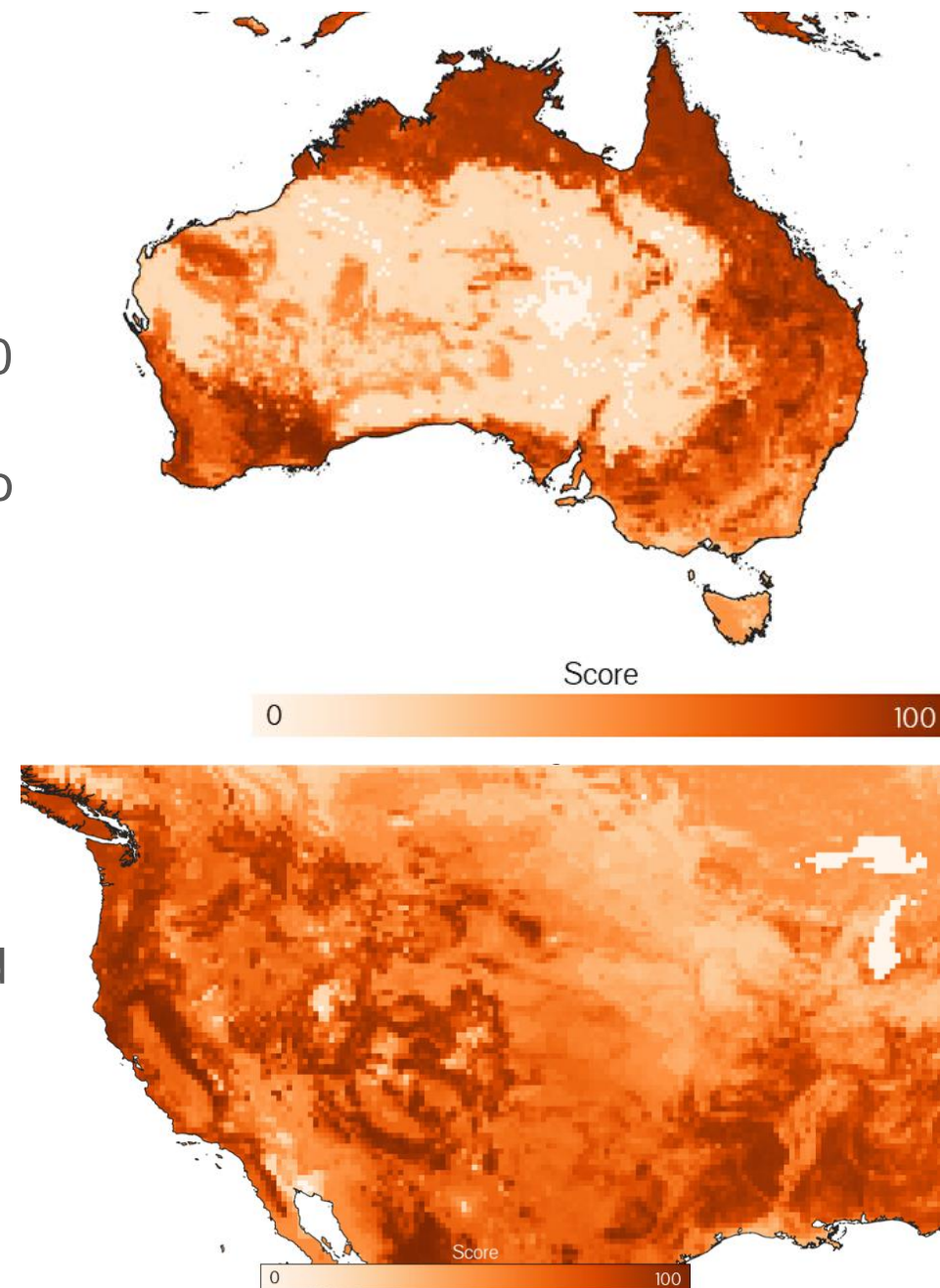
MSA Exposure to Sea Level Rise



Source: Moody's Analytics REIS, Four Twenty Seven

+ Wildfire Analytics

- First of its kind dataset that provides forward-looking, granular projections of increase in wildfire potential globally
 - Specs: ~ 25x25km scale, global coverage, timeframe 2030-2040
 - Uses peer review indicator that measures soil moisture (heat + drought), overlaid with detailed geospatial imagery of land use to focus on burnable vegetation.
- Key Findings
 - High risk regions like California, Western Australia, Southern Europe will see 1-3 months worth of additional 'high wildfire potential' days
 - Sensitive forests (Amazon, SE Asia) will be more at risk, which threatens critical 'carbon sinks' and worsens climate change and biodiversity risk
 - Areas currently 'low risk' (cool and humid) will become higher risk: Alaska, Siberia, etc.



+ Integration in Credit Risk Ratings

MOODY'S INVESTORS SERVICE STRUCTURED FINANCE

Appendix: Top 10 loan summaries

1. The Chase Center Towers

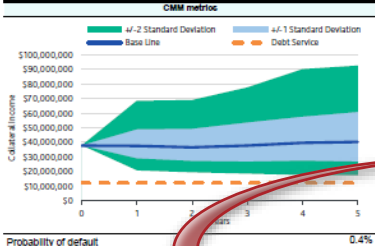
Collateral summary	
% of pool	15.8%
Pool amount	\$101,250,000
Originator	JPMCB
Structured Credit Assessment	a2 (6ca pd)
Property type	Office - CBD
Location	San Francisco, CA
Red-Yellow-Green™	Yellow (36.9)
Size	\$86,208 SF
Year built/Renovated	2019 / NAP
Occupancy	100% as of 05/10/2020
Ownership	Fee Simple
Purchase price	N/A

Debt summary		Moody's	
		LTV	DSCR
Pool balance	\$101,250,000	65.3%	3.65x
Part passu balance	\$168,750,000	65.3%	3.65x
B-Note & C-Note	\$330,000,000	145.1%	1.05x
First mortgage balance	\$600,000,000	145.1%	1.05x
Mezzanine	\$0	145.1%	1.05x
Total	\$600,000,000	145.1%	1.05x



Source: Term sheet

CMM metrics	
▲/-2 Standard Deviation	▲/-1 Standard Deviation
Base Line	Debt Service



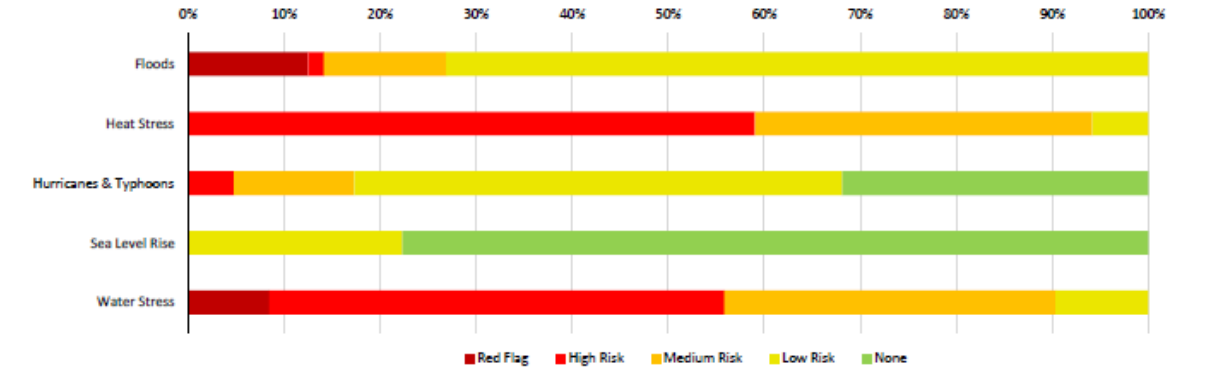
Third party summary				
Report	Vendor	Date	Issues	Note
Appraisal	CBRE	12/19/2019	No	1
Environmental	Partners	10/11/2019	No	1
Engineering	Partners	10/11/2019	No	1
Seismic	Partners	11/7/2019	No	1

Notes:
1. No significant issues.
2. SUI: 20%, SEL: 14%.

18 11 May 2020 Benchmark 2020-IG2 Mortgage Trust: Pre-Sale - \$639.1 million CMBS large loan transaction

MOODY'S INVESTORS SERVICE STRUCTURED FINANCE

Exhibit 17
Share of risk exposure of AREIT 2020-CRE4 to five categories of climate risk



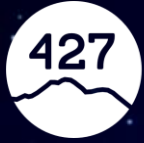
Source: Four Twenty Seven, Moody's Investors Service

The red flag floods exposure stems from properties in this transaction in coastal Jacksonville, FL. Climate change is causing sea levels to rise because of rising temperature and ice melt. Over the long term, sea level rise threatens to alter and potentially damage our coastlines and presents a major threat to numerous coastal properties. Today, rising seas already affect real estate by contributing to increased "nuisance" flooding and king tide coastal flooding in low lying coastal areas such as Miami, Florida. Sea level rise also exacerbates the flood risk from storm surges, as experienced with Hurricane Sandy and Hurricane Florence.

Source: Moody's Investor Services
Credit Opinion: AREIT 2020-CRE4
Pre-Sale Report. May 13, 2020

Four Twenty Seven physical climate risk			
Climate Hazard	Risk Level	Site Score	Country Benchmark
Floods	Low	7	17
Heat Stress	Medium	39	44
Hurricanes & Typhoons	None	0	18
Sea Level Rise	Red Flag	80	6
Water Stress	High	61	45

Source: Moody's Investor Services – Credit Opinion:
Benchmark 2020-IG2 Mortgage Trust. May 11, 2020



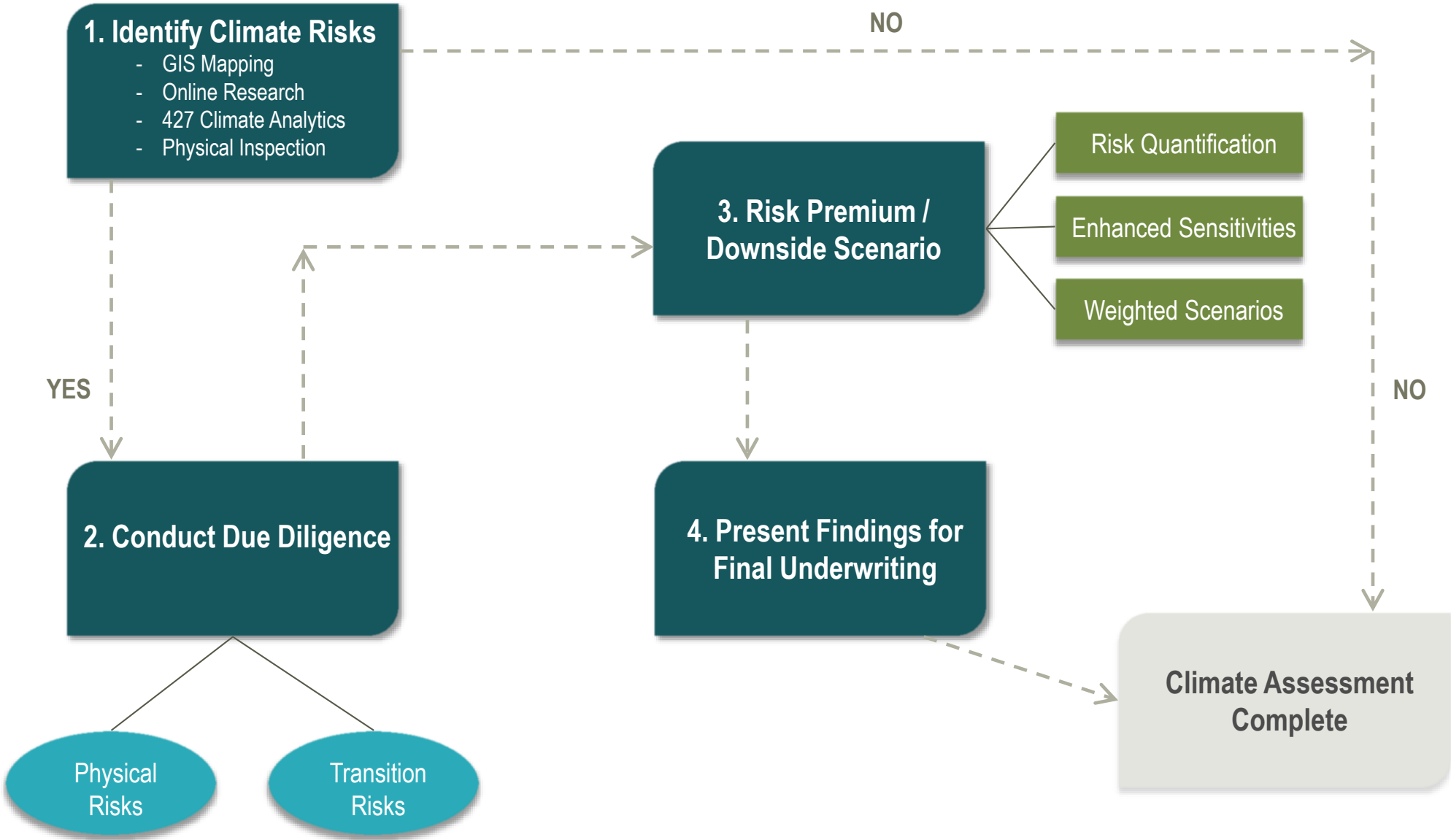
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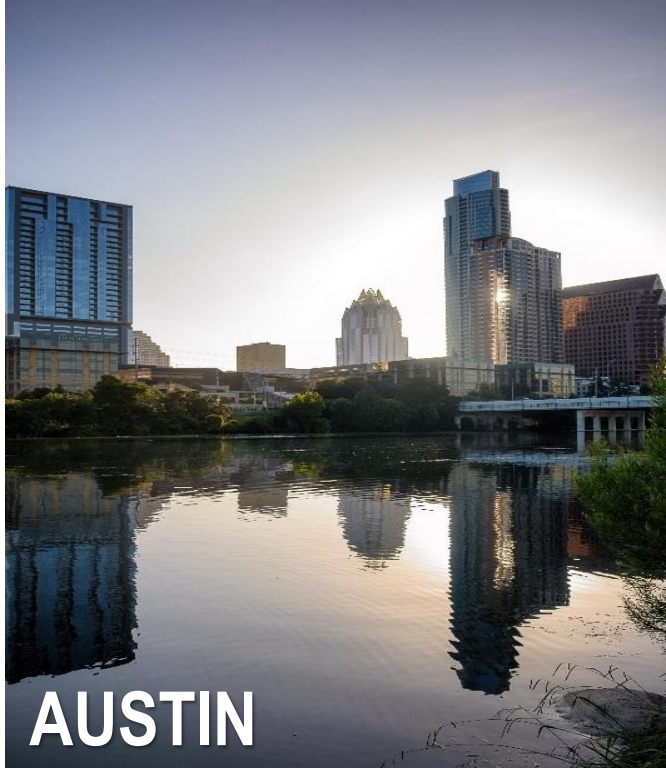


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[427mt.com](https://www.427mt.com)

UNDERWRITING REVIEW PROCESS EXAMPLE





AUSTIN

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Suite 2030
Austin, TX 78701



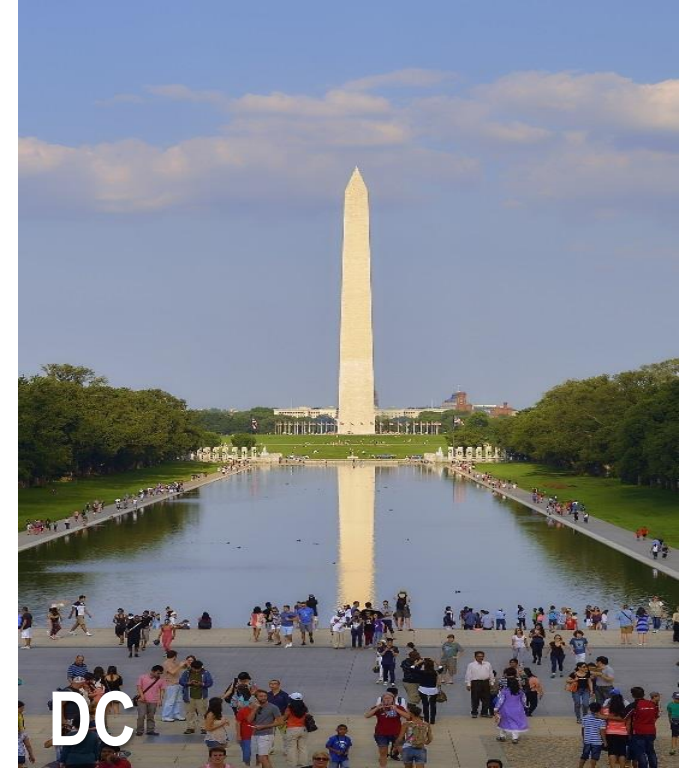
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