

# Stockholm Central Station: A Steel-Timber Transit-Oriented Development

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**John Peronto, *Senior Principal*, Thornton Tomasetti**



**CTBUH 2022  
Steel-Timber Conference**

The background image shows a wide-angle view of a city street in Stockholm. On the right side, there is a large, ornate, light-colored building with many windows, identified as the Stockholm Central Station. To the left, there are modern multi-story buildings with glass facades. The street is paved and has some traffic. The sky is a clear, pale blue. A large, semi-transparent watermark with the text "Council on Tall Buildings and Urban Habitat" is diagonally across the image.

**Foster + Partners**

**Thornton Tomasetti**

CTBUH Presentation - 24/05/22

**Stockholm Central Station**



# 30+ Years in Rail Infrastructure

1990



**King's Cross Masterplan**  
London, England  
1987



**Metro System**  
Bilbao, Spain  
1988 - 1995



**Canary Wharf**  
Underground Station  
London, England  
1991 - 1999

2000



**HACTL Superterminal,**  
Chek Lap Kok  
Hong Kong  
1992 - 1998



**Ground Transportation Centre,**  
Chek Lap Kok  
Hong Kong  
1992 - 1998



**Kowloon-Canton Railway Terminal**  
Hong Kong  
1992 - 1998

2010



**Florence High-Speed**  
Railway Station  
Italy 2003 -



**Dresden Station**  
Dresden, Germany  
1997 - 2006



**Metro System**  
Bilbao, Spain  
1997 - 2004



**Expo Station**  
Singapore  
1997 - 2001



**St Pancras International Station**  
London, England  
1996



**North Greenwich Transport Interchange**  
London, England  
1995 - 1998

2015



**Crossrail Park and Retail,**  
Canary Wharf  
London, England 2008 - 2016



**New Slussen Masterplan**  
Stockholm, Sweden 2009 -



**Haramain High-Speed Rail**  
Saudi Arabia  
2009 - 2019



**York University Station**  
Canada 2009 - 2018



**Kai Tak Cruise Terminal**  
Hong Kong 2010 - 2013



**Jeddah Metro**  
Jeddah, Saudi Arabia 2015 - 2016

2020



**Stockholm Central Station**  
Stockholm, Sweden  
2020 -



**JP Morgan Headquarters**  
New York, USA  
2018 - 2023



**Centennial Yards**  
Atlanta, USA  
2020 -



**BART Silicon Valley**  
Saudi Arabia  
2019 - 2028



**Principal Place**  
United Kingdom  
2013 - 2019

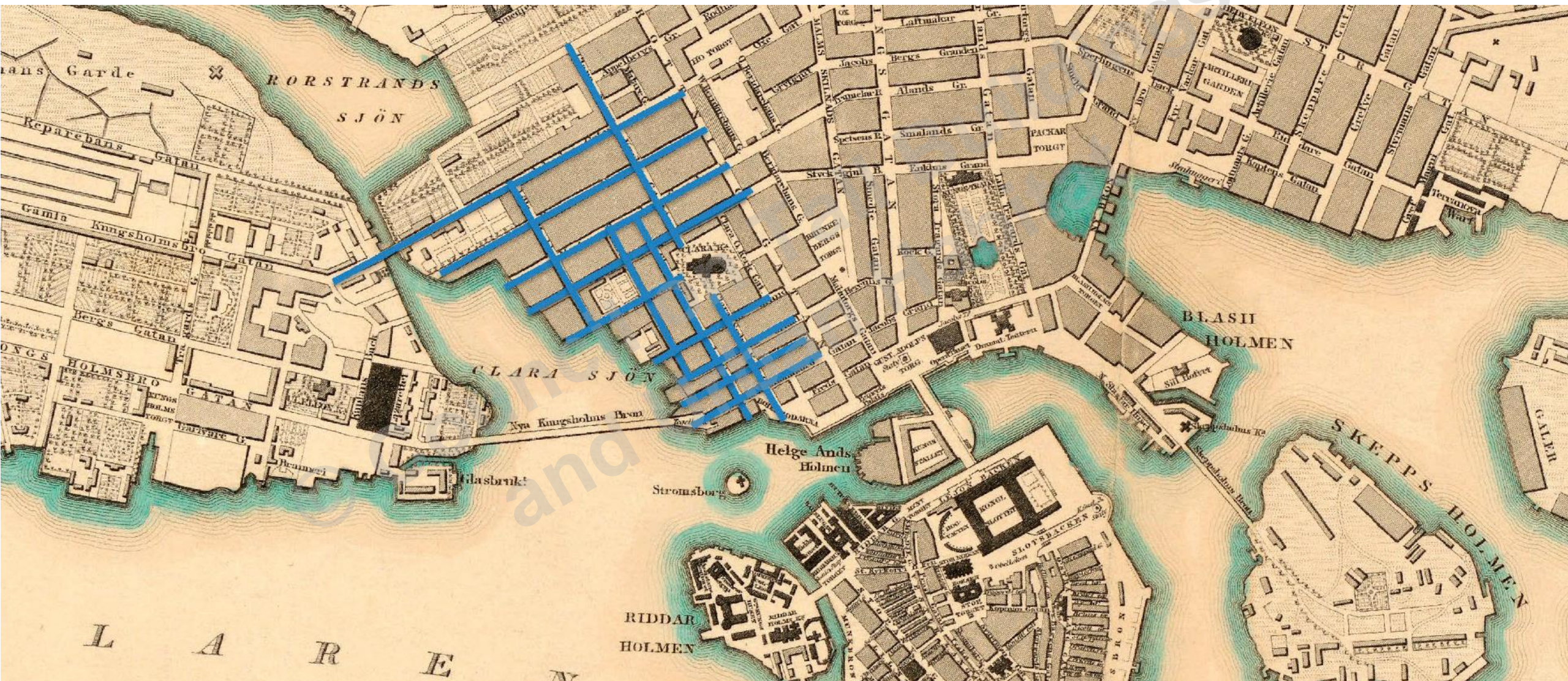


**Sydney Metro**  
Australia  
2016 -



# Urban Design

## The Historical Urban Fabric





# Urban Design

The Station Fractured the Urban Fabric





# Urban Design

View from South Today – 150 years Later





# Urban Design: The opportunity to repair and stitch the city back together

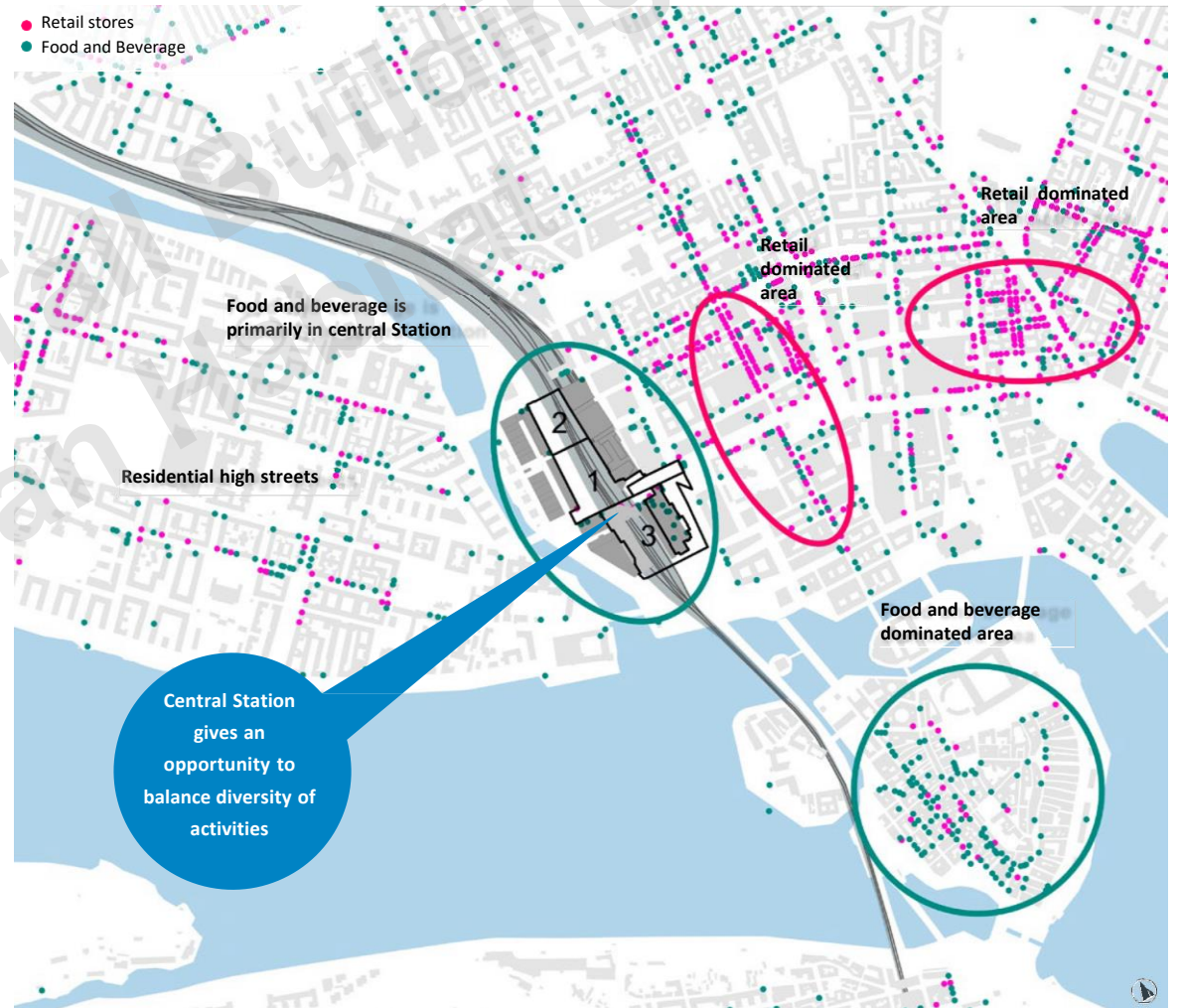
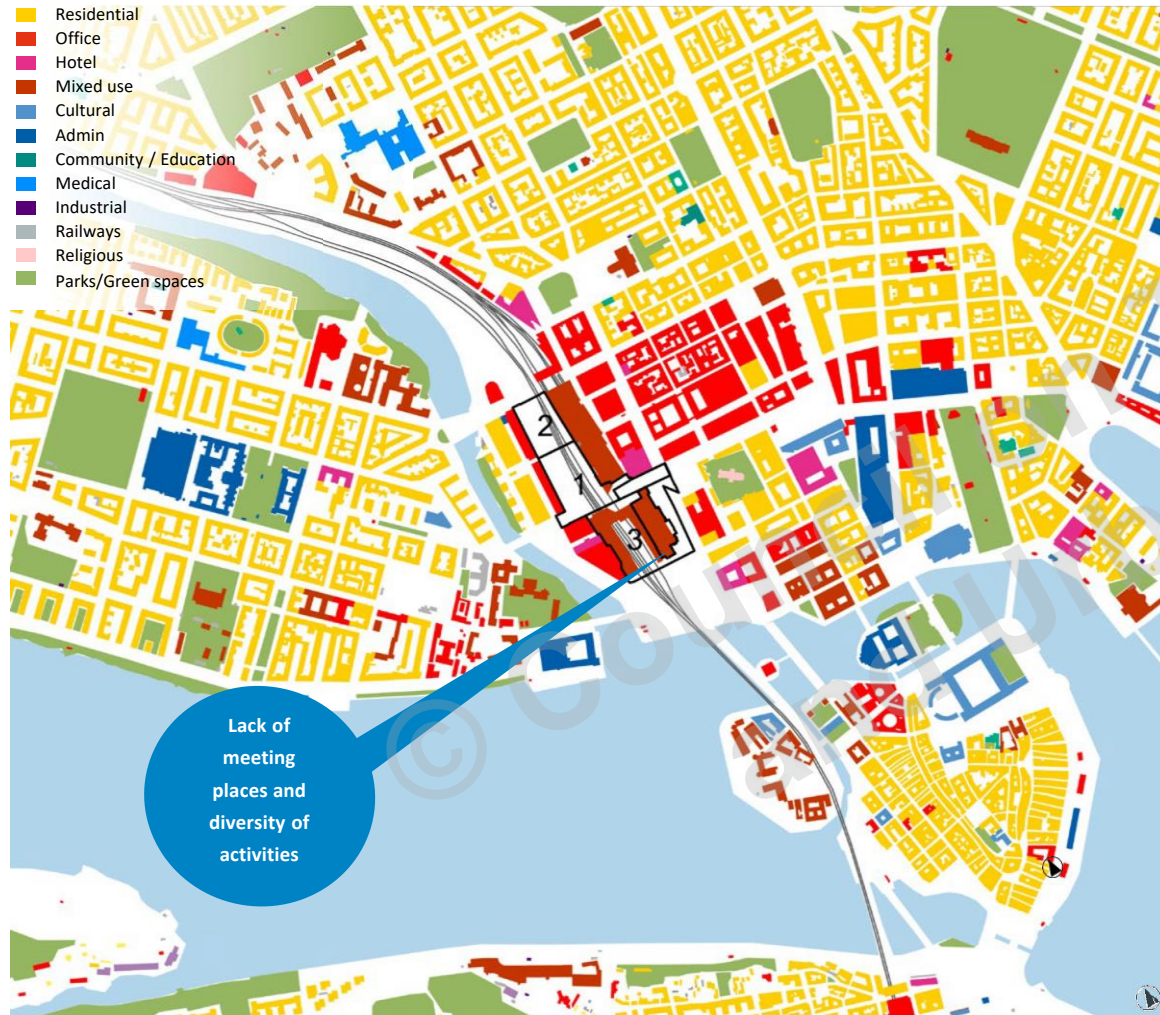
## A Gateway to Stockholm





# Urban Design

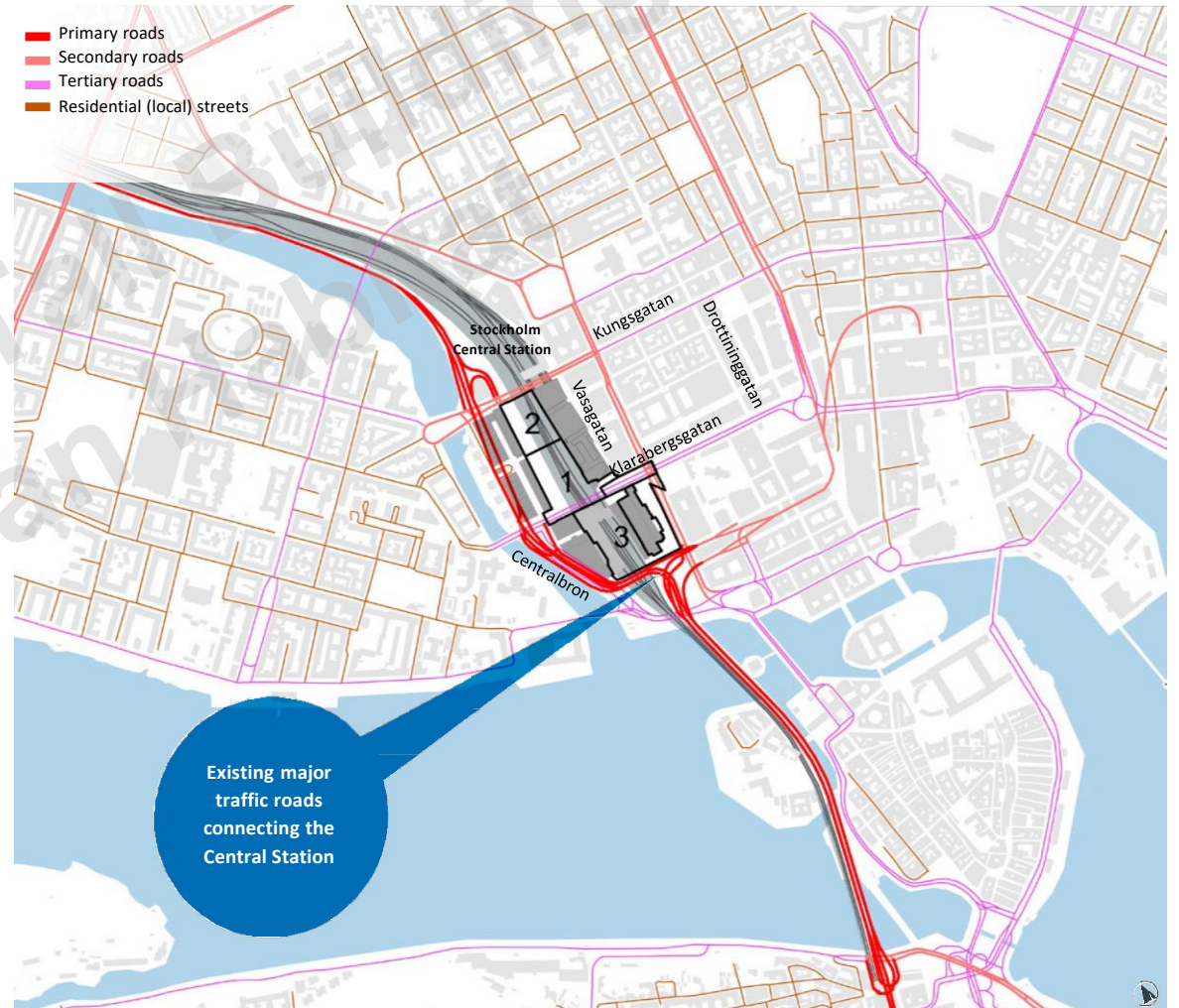
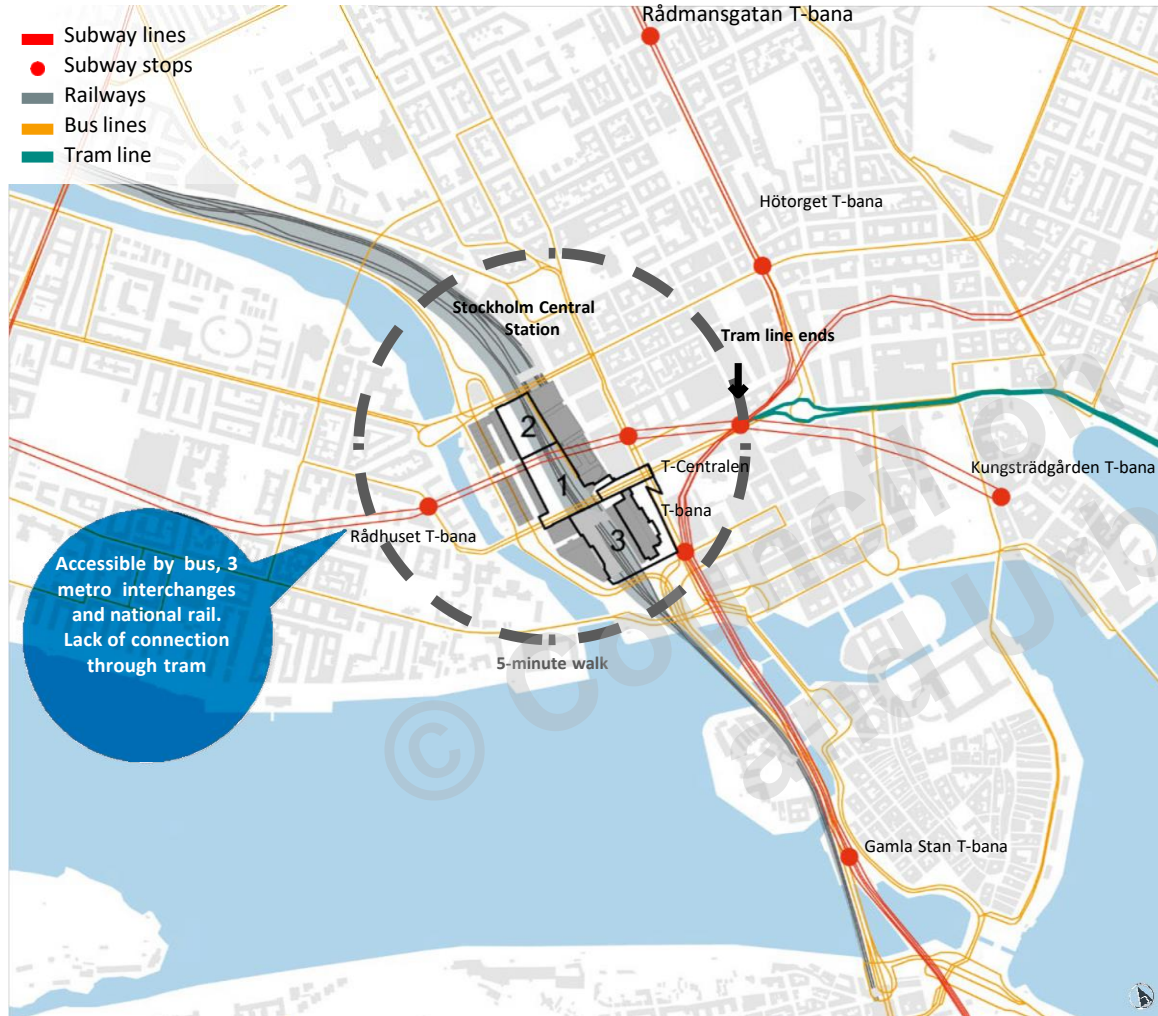
## Analysis of the Existing Building Functions + Streets





# Urban Design

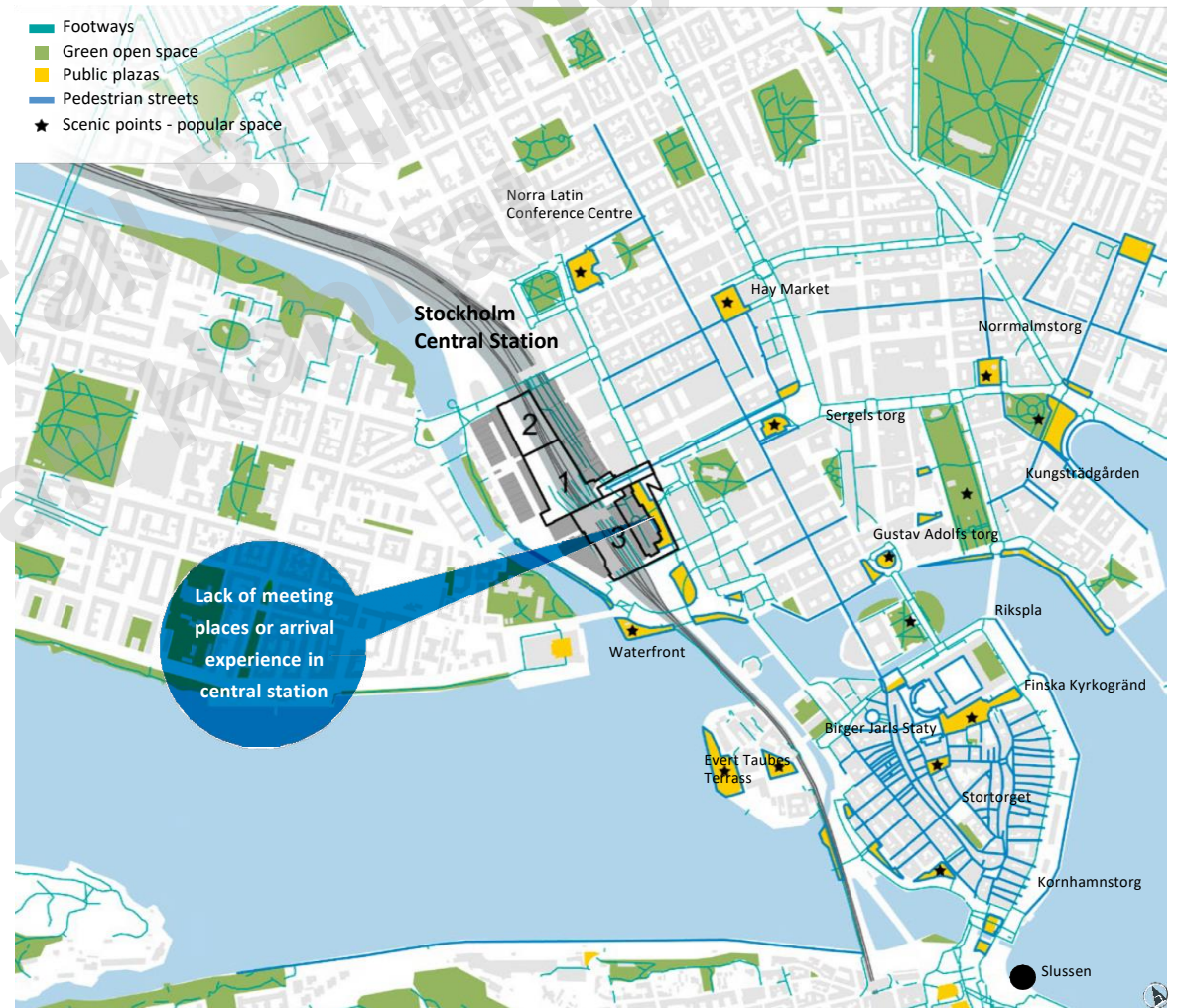
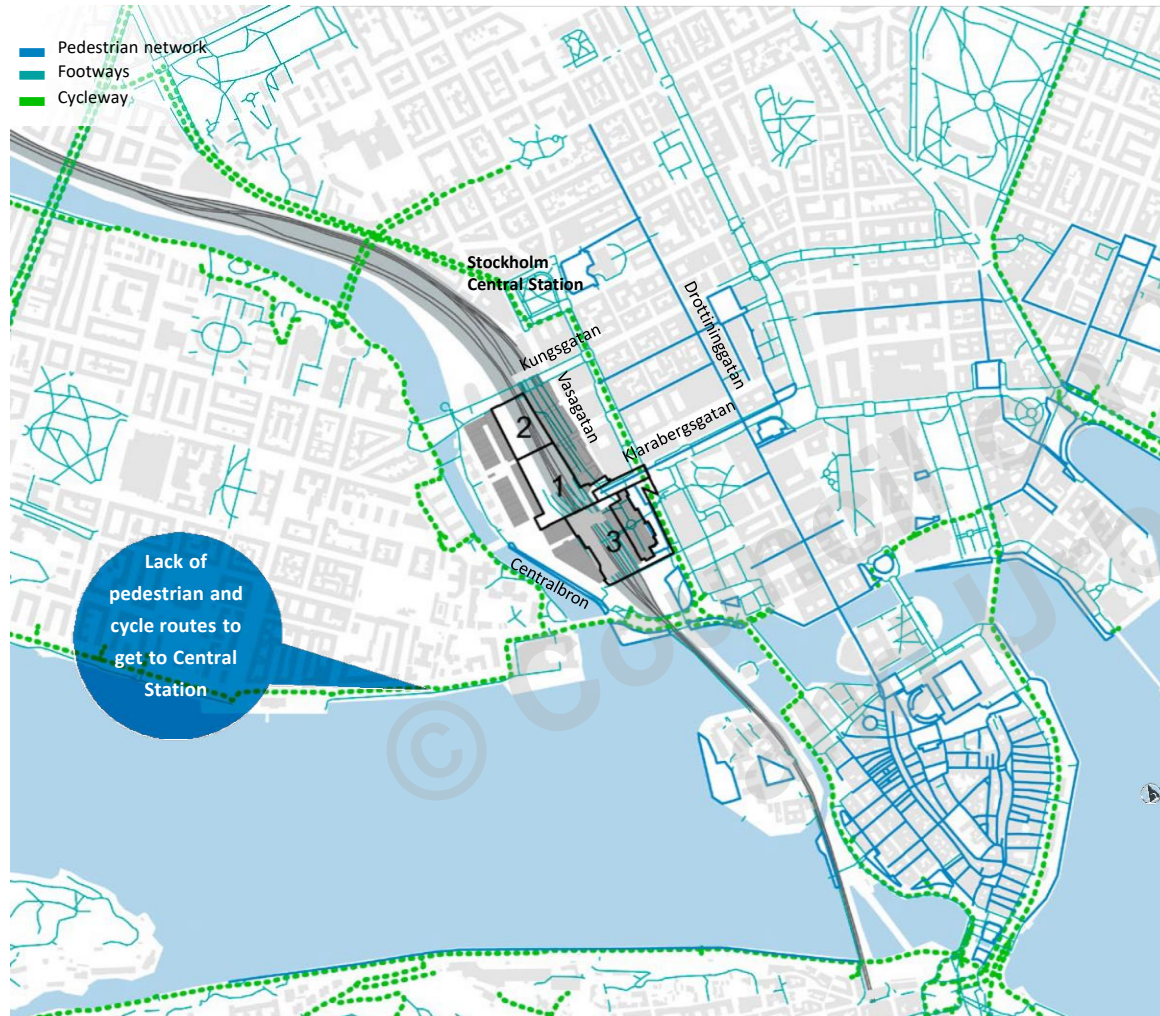
## Analysis of the Existing Transportation Network





# Urban Design

## Analysis of the Existing Public Realm + Parks









Slide Title  
Slide Sub-title





## Urban Interventions

The Current Klarabergsgaten Viaducten



30m Viaduct



# Urban Interventions

## Proposed Klarabergs Viaducten













# Station Interventions

## Current Station Hall





# Station Interventions

## Extended Station Hall





# Station Interventions

## Extended Station Hall









# Urban Interventions

## Station Hall Extension





# Urban Interventions

Station Hall Extension from Vasagatan



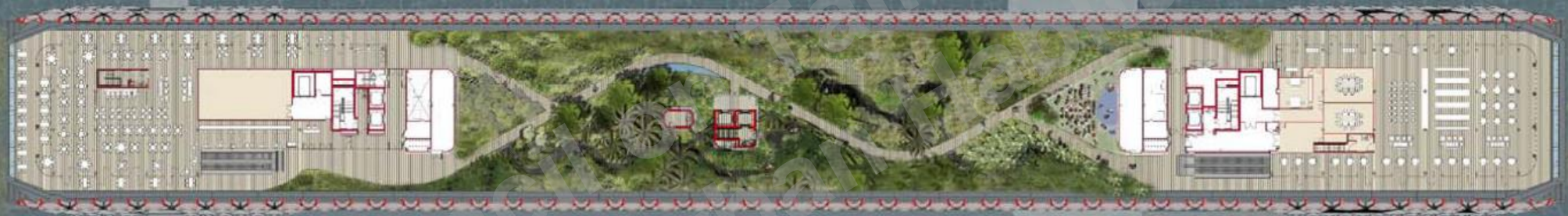


# Tools Examples | From 3D to 4D and Full Interactivity





Cross Rail Station – London





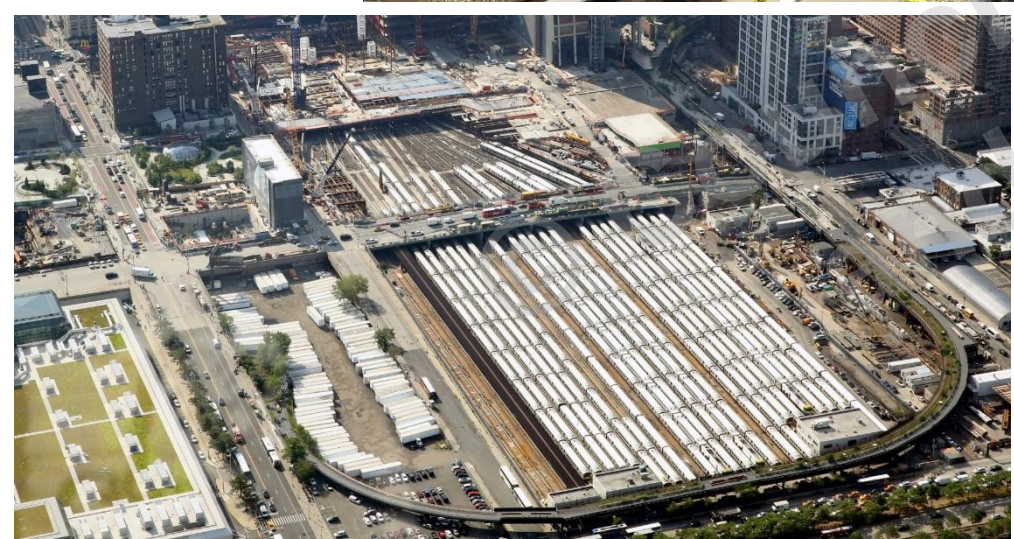
Cross Rail Station – London





# Hudson Yards – New York

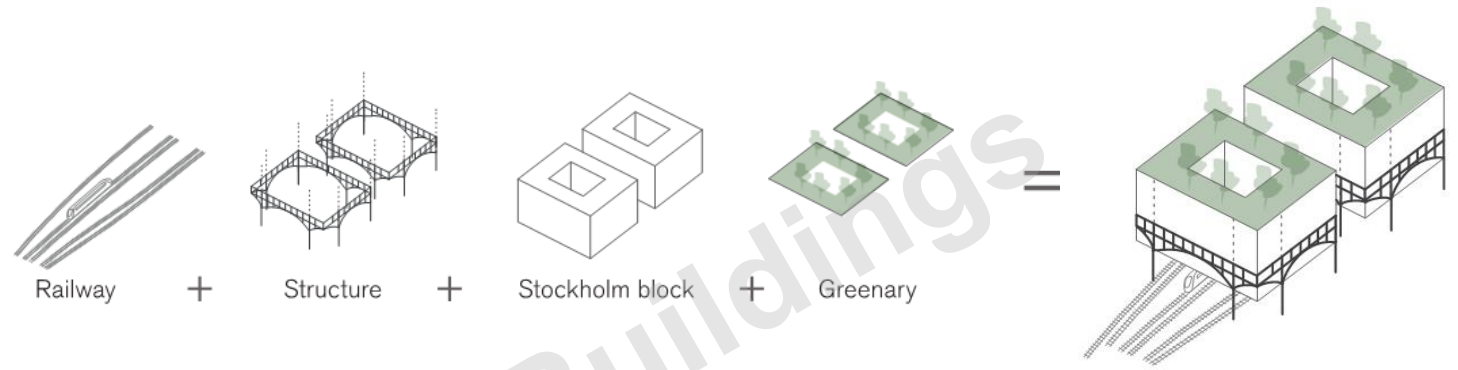
## TOD – Development Over Rail





# Feasibility & the Way Forward

## Structural System Composition



3. Hybrid Steel-CLT Superstructure

2. Arched Steel Trusses

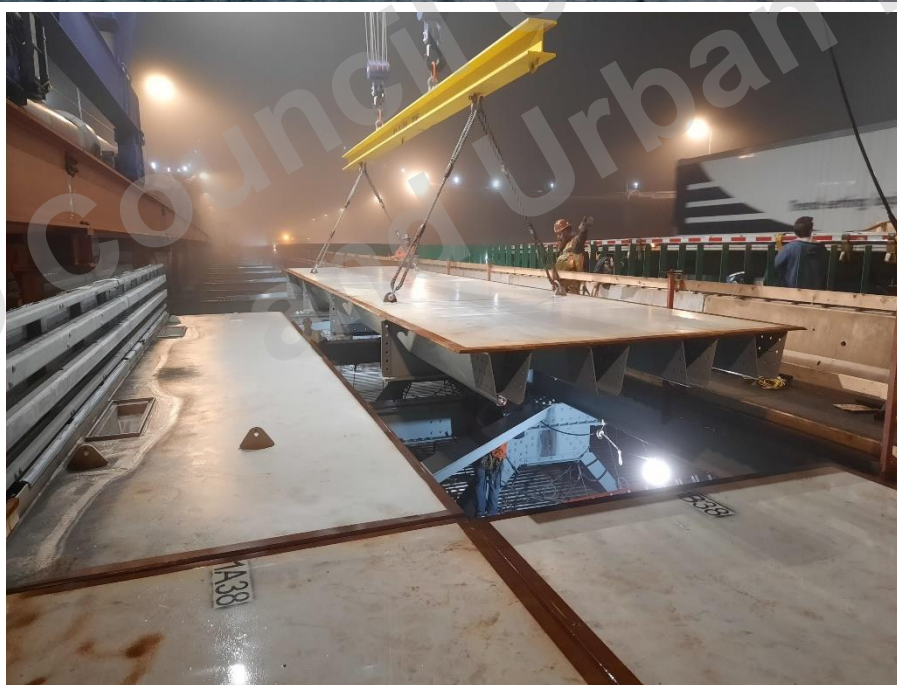
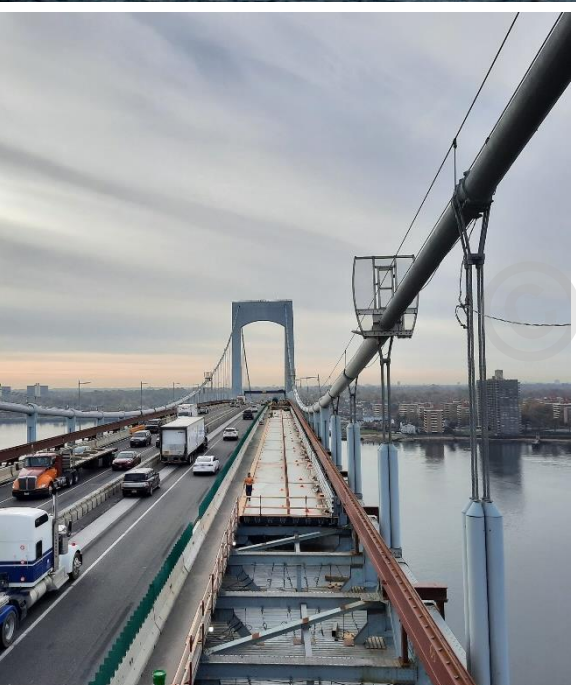
1. Orthotropic Steel Deck





# Feasibility & the Way Forward

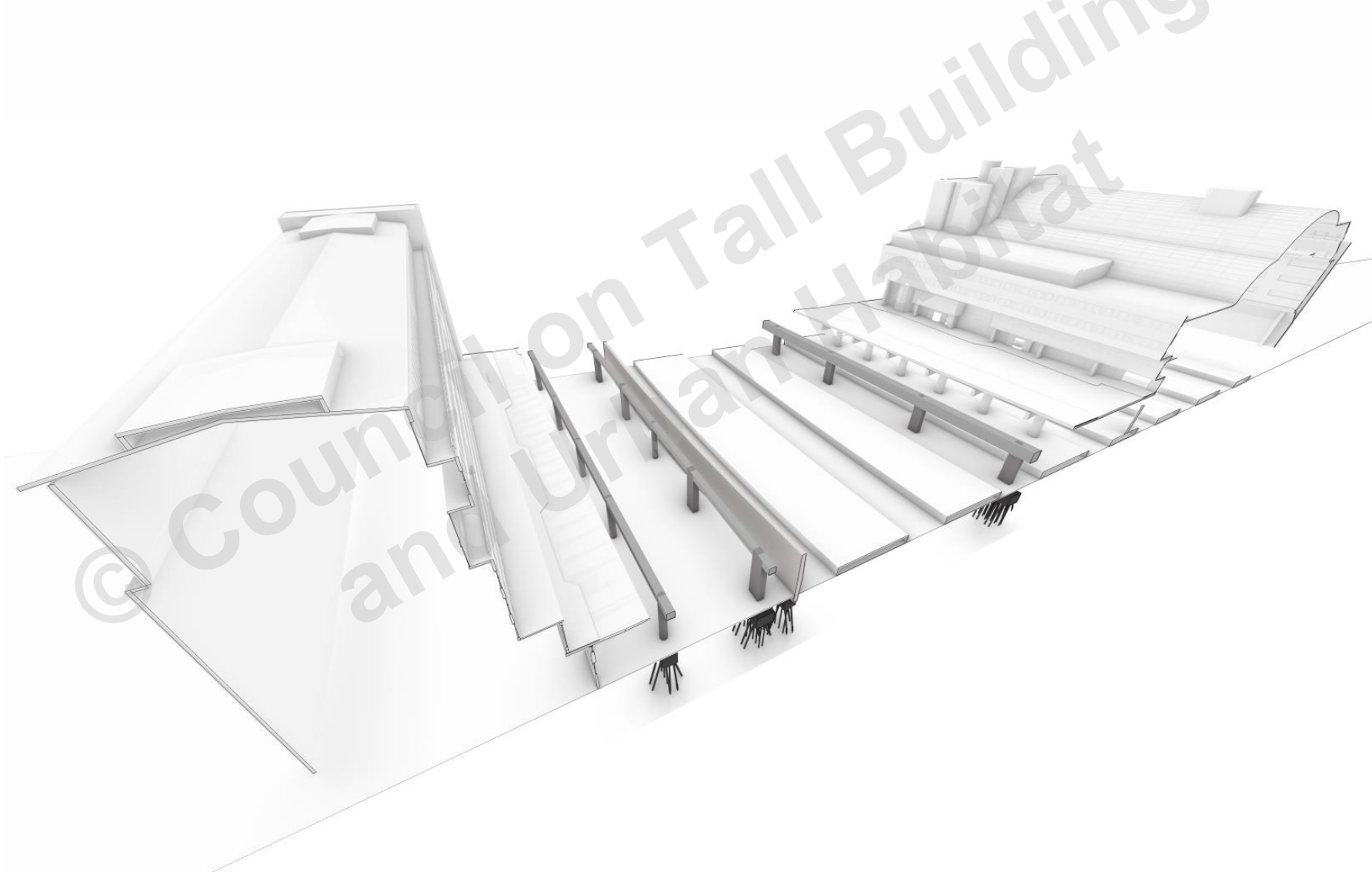
## Orthotropic Deck in Real Life





## Feasibility & the Way Forward

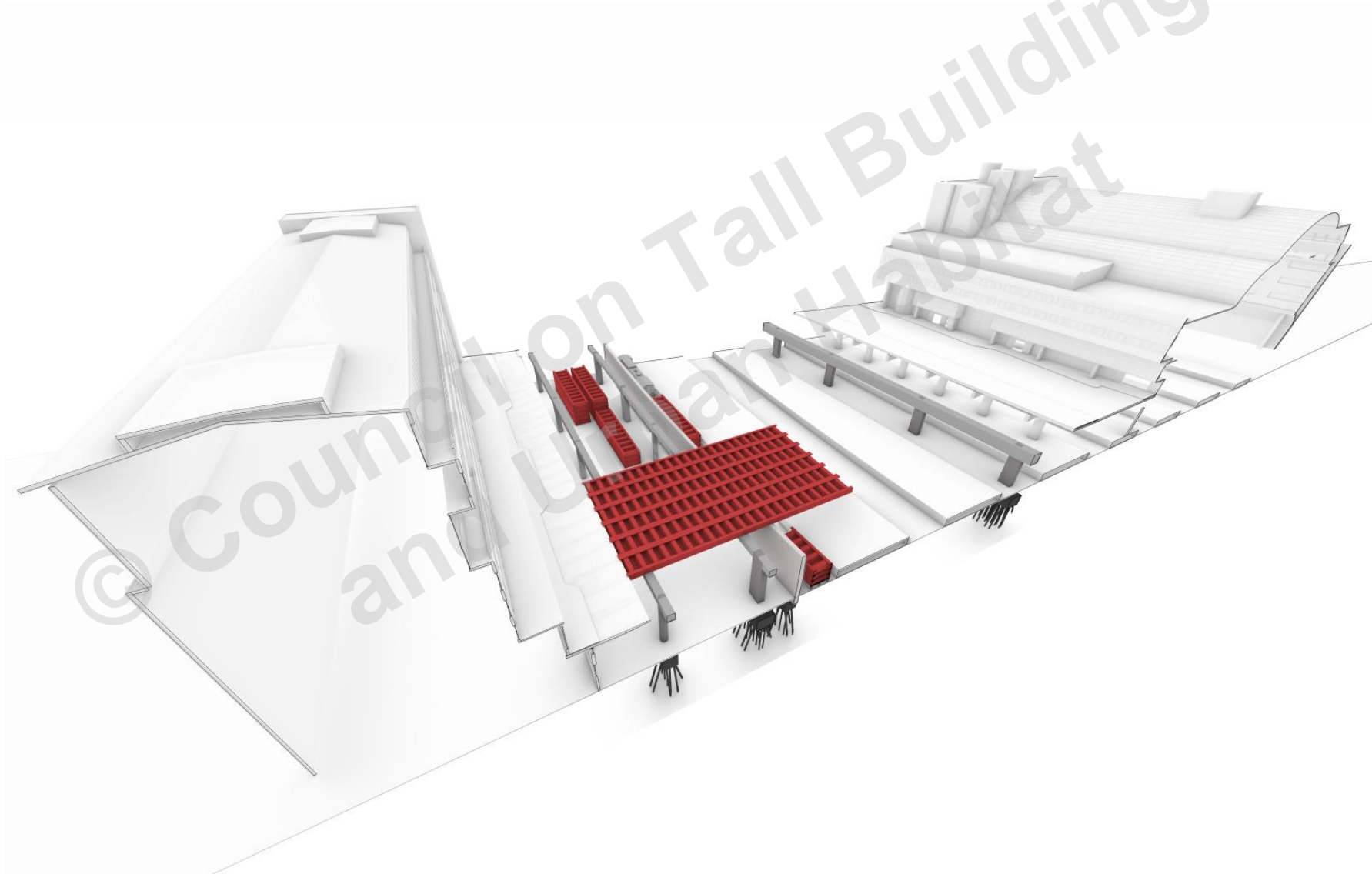
### Substructure Installation





## Feasibility & the Way Forward

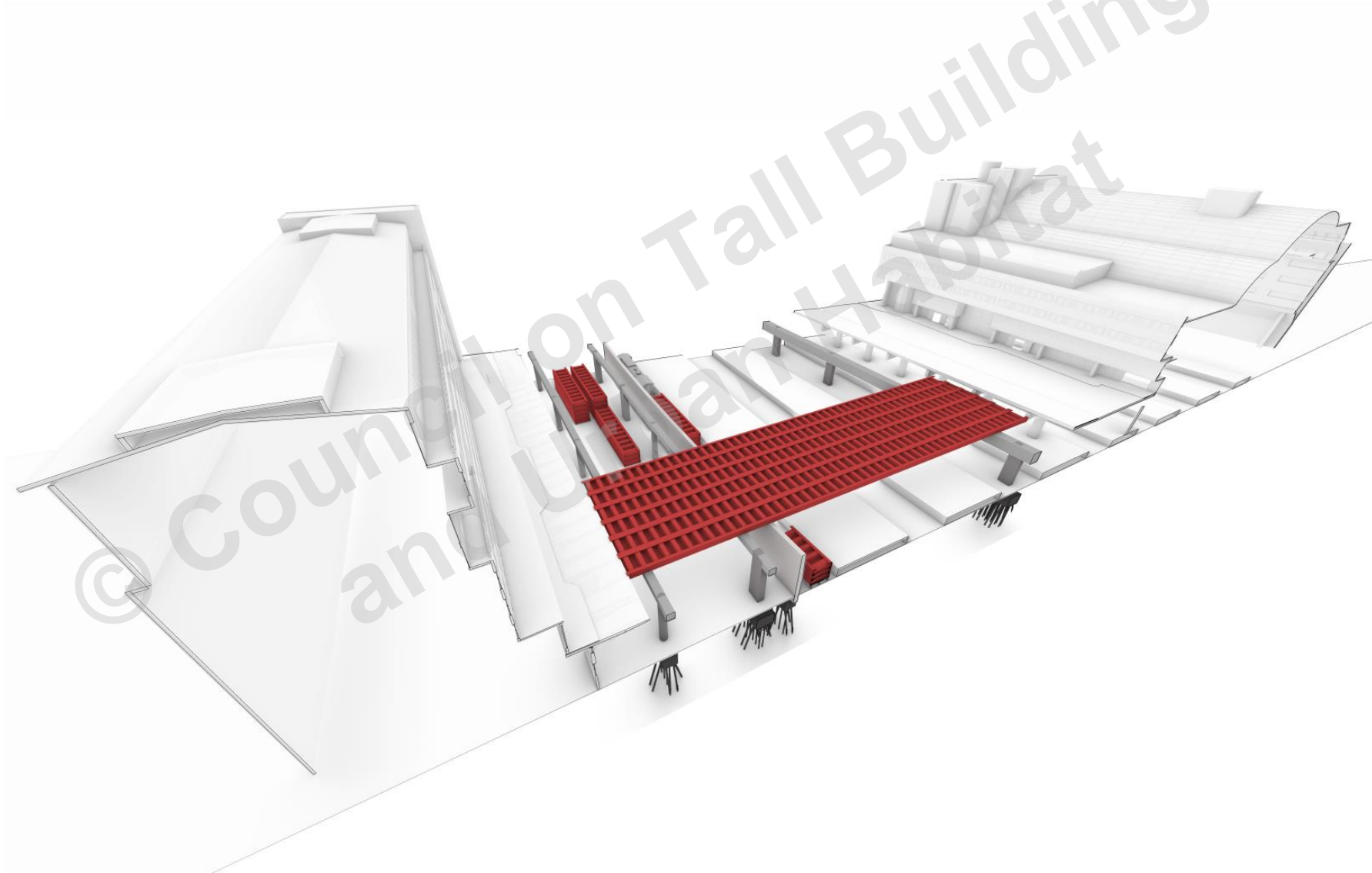
### Deck Installation - Logistics





## Feasibility & the Way Forward

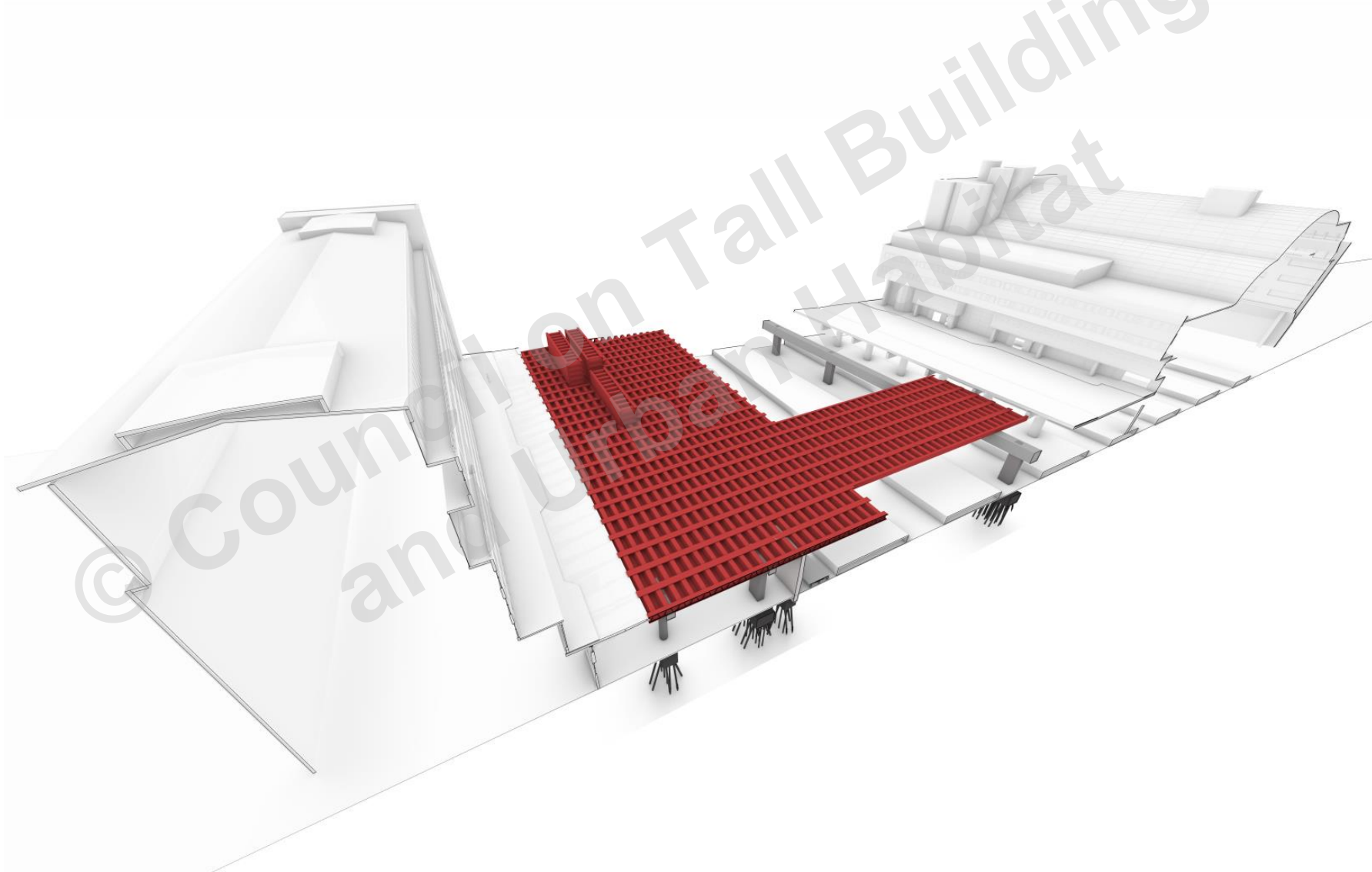
Deck Installation – Panels





## Feasibility & the Way Forward

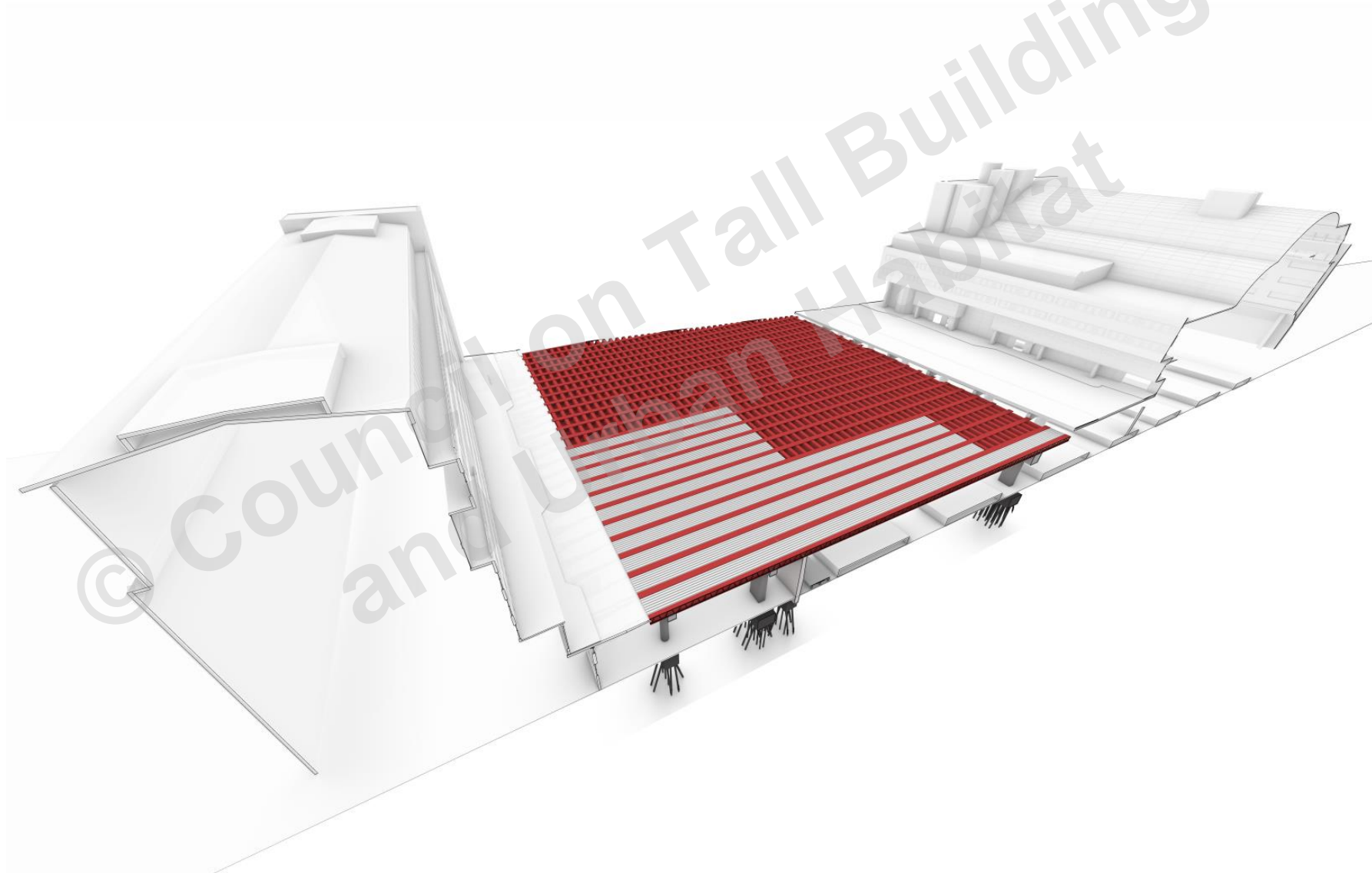
Deck Installation – Panels





## Feasibility & the Way Forward

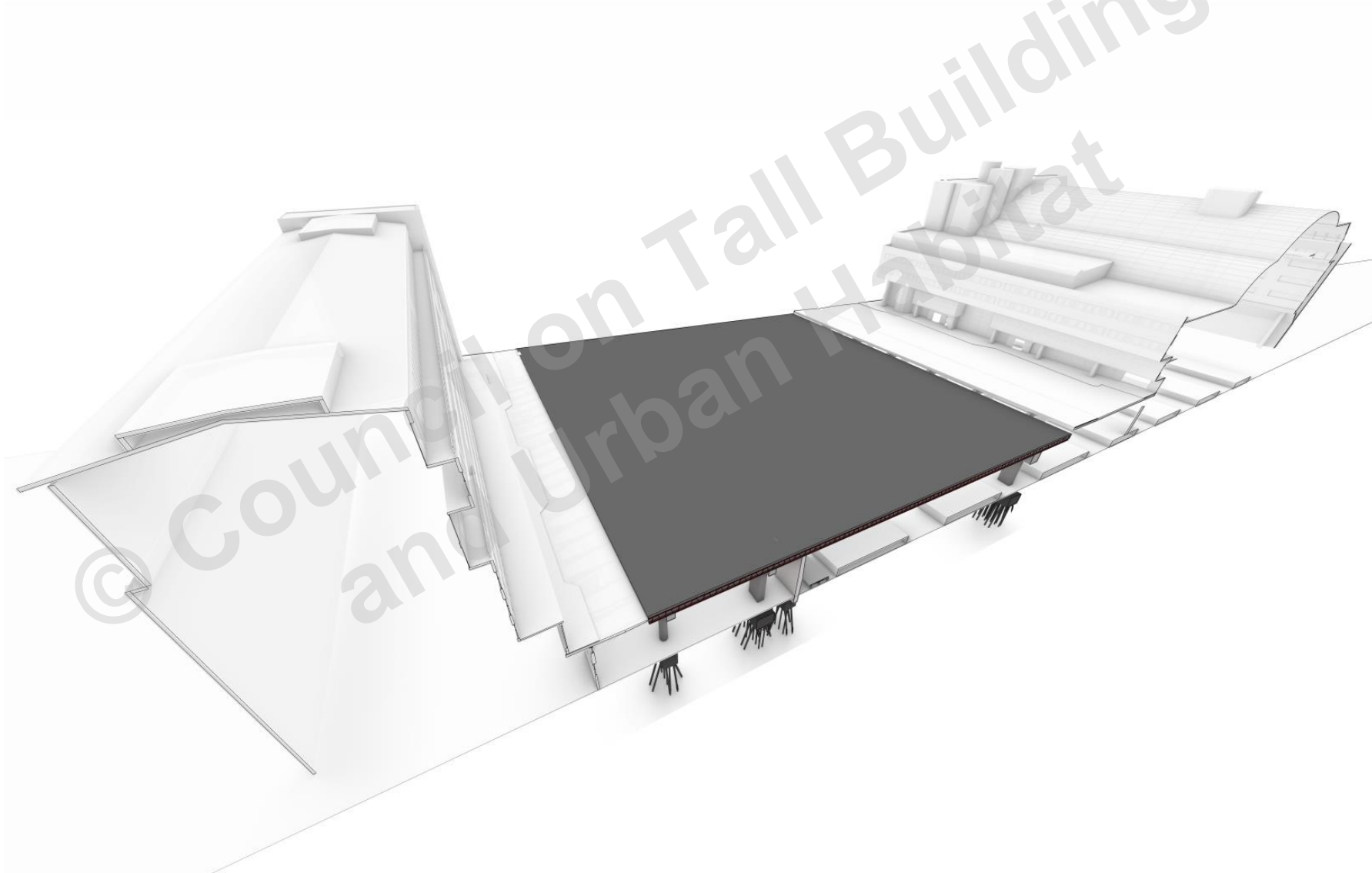
Deck Installation – Form Deck





## Feasibility & the Way Forward

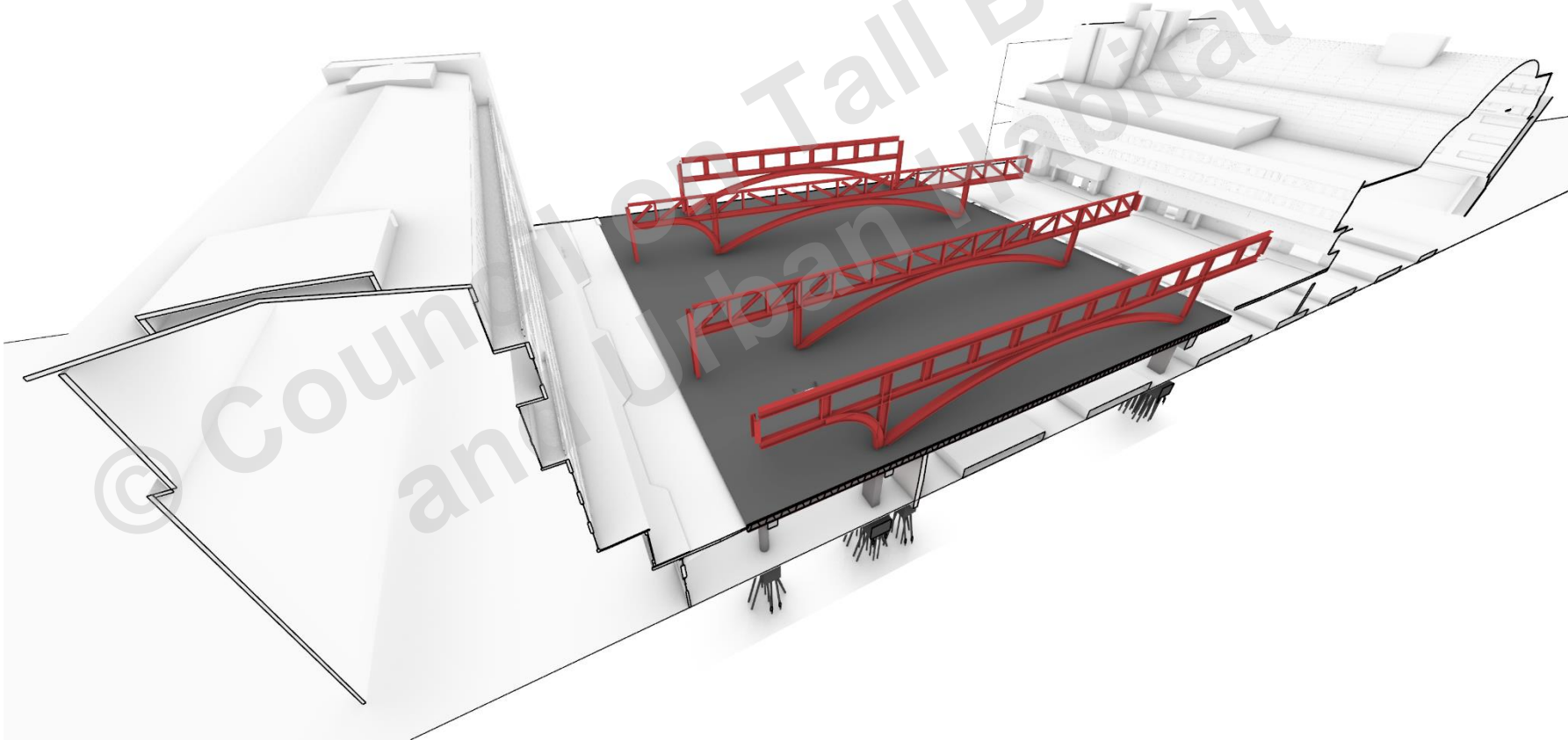
Deck Installation – Monolithic Concrete Topping





## Feasibility & the Way Forward

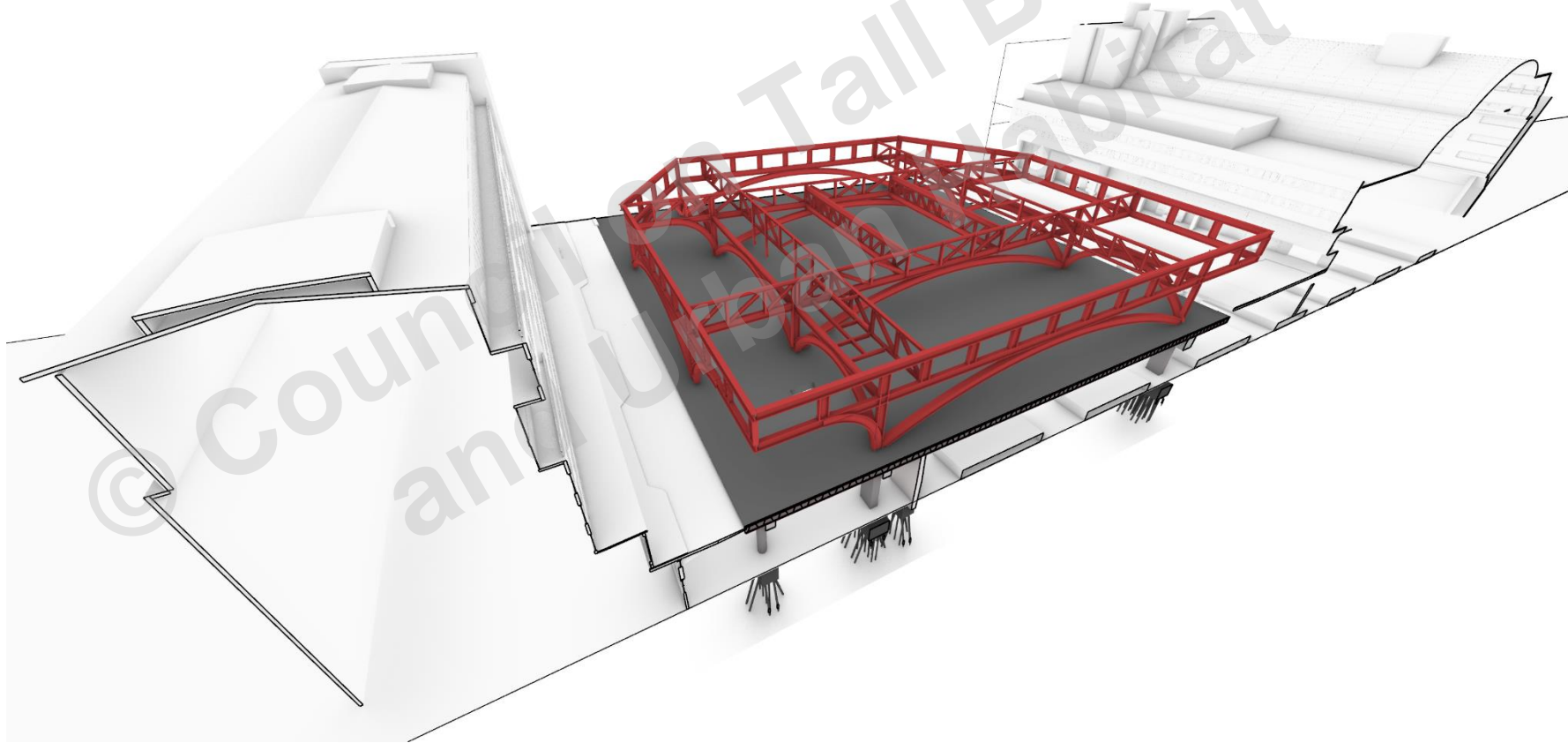
Arched Platform Installation – Primary Trusses





## Feasibility & the Way Forward

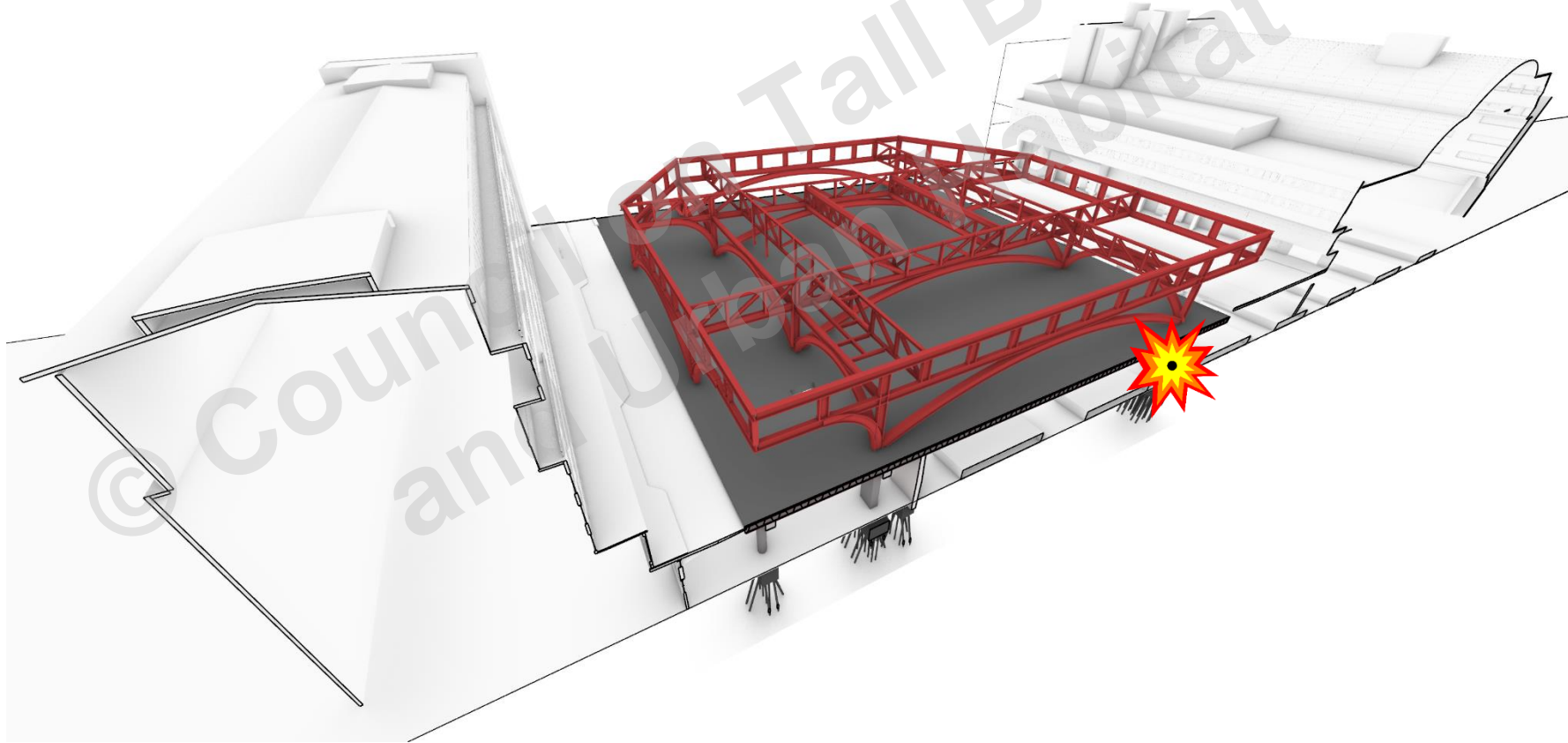
Arched Platform Installation – Secondary Trusses





## Feasibility & the Way Forward

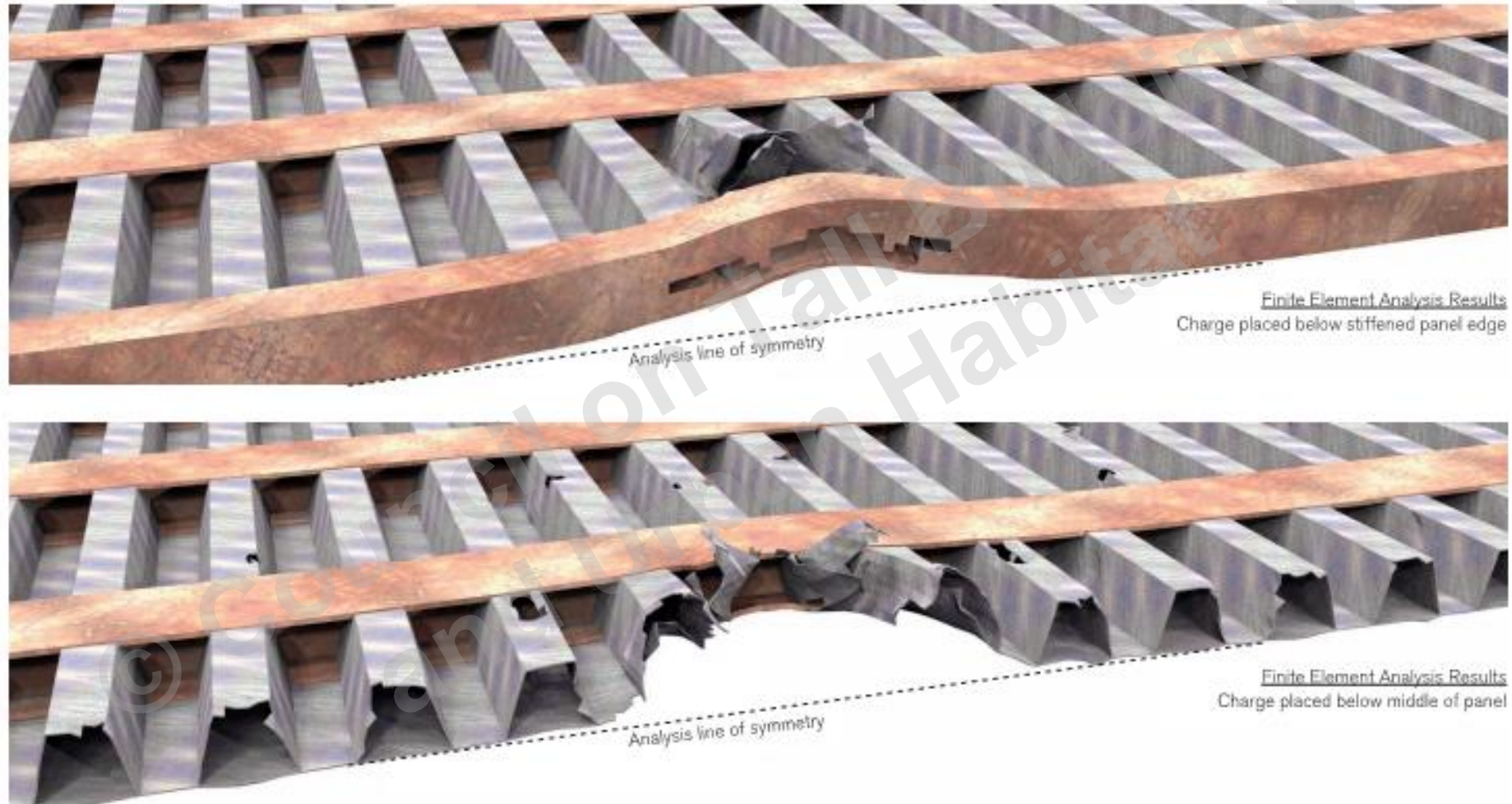
Arched Platform Installation – Redundancy





## Feasibility & the Way Forward

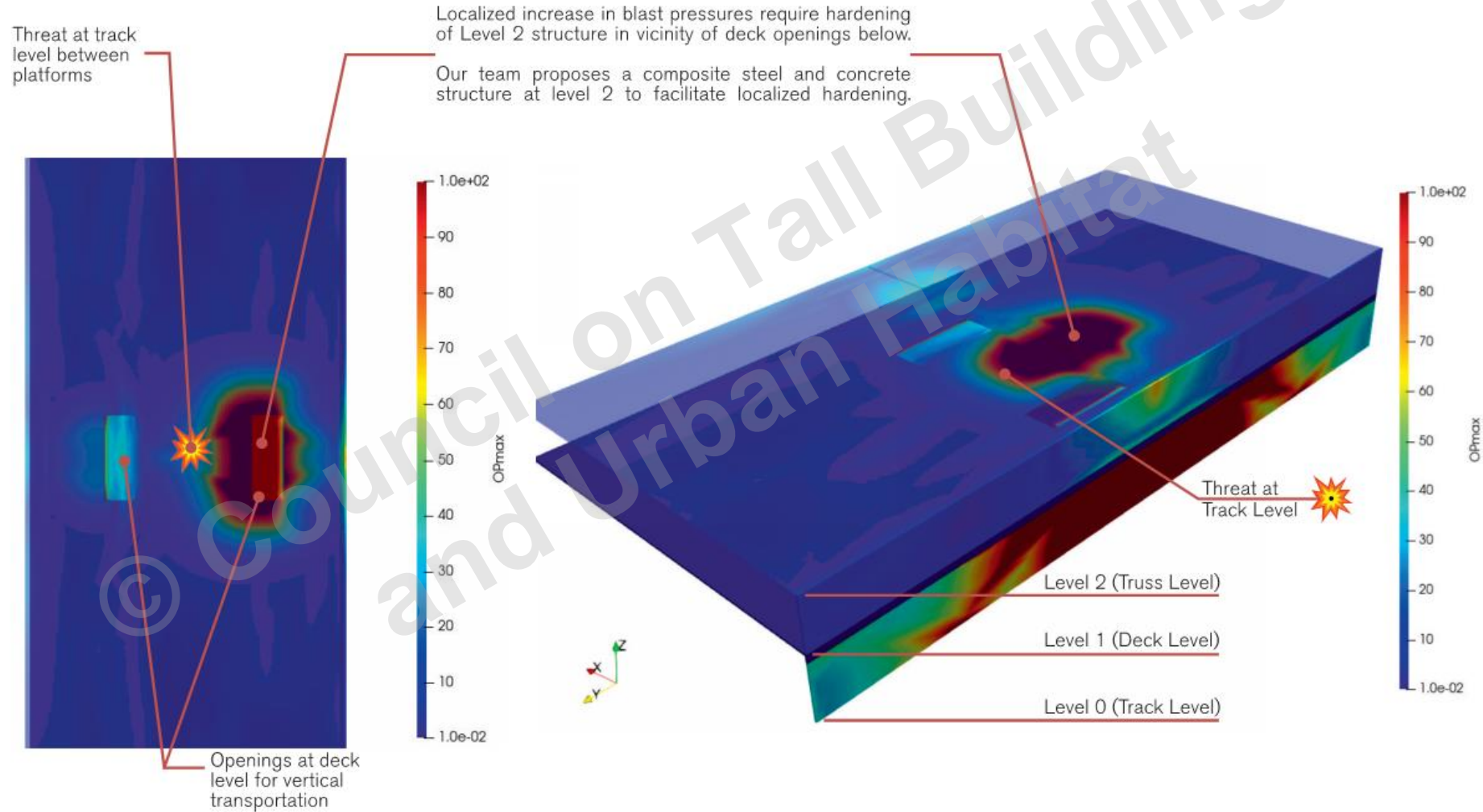
### Orthotropic Deck Blast Resistance





# Feasibility & the Way Forward

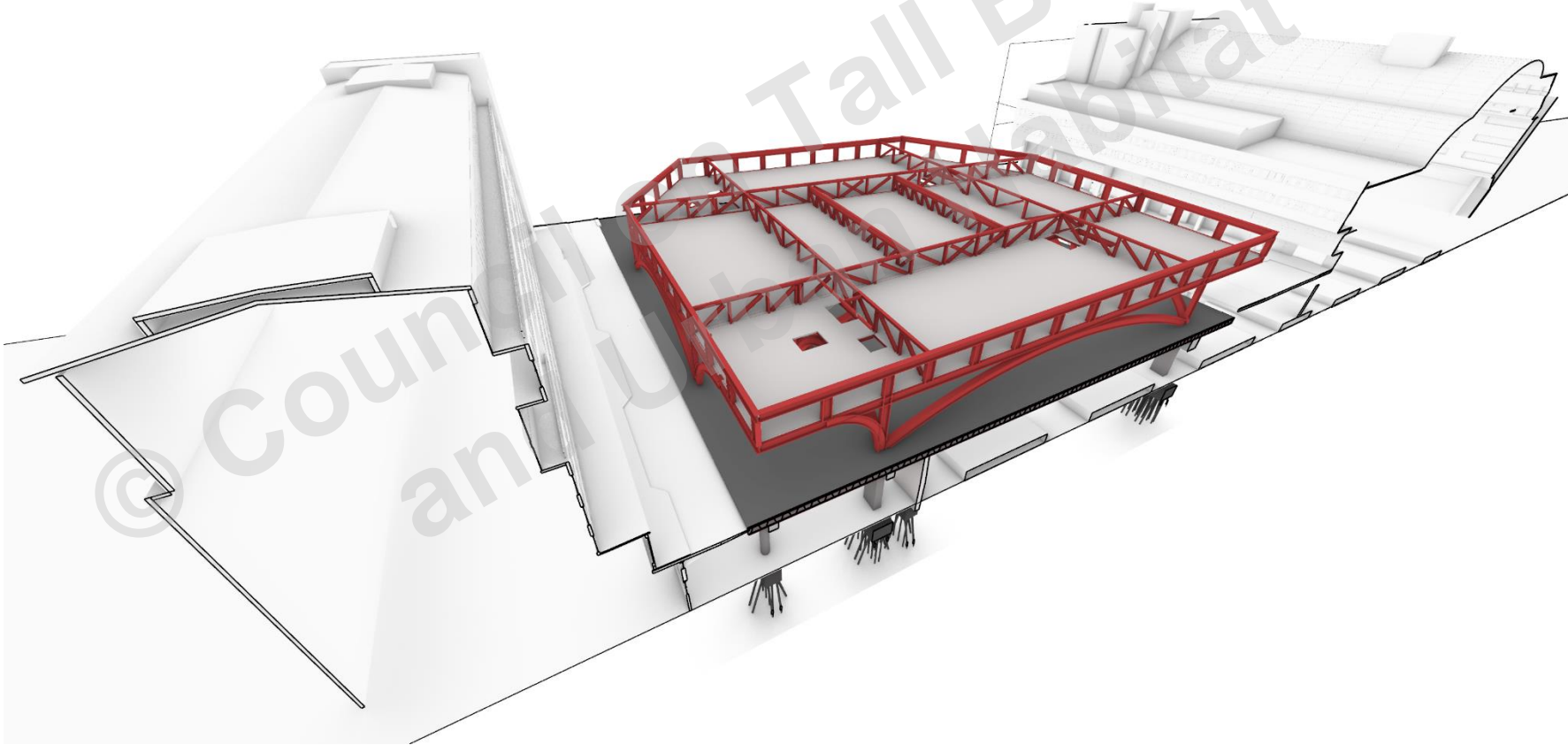
## Blast Pressures on Composite Slab





## Feasibility & the Way Forward

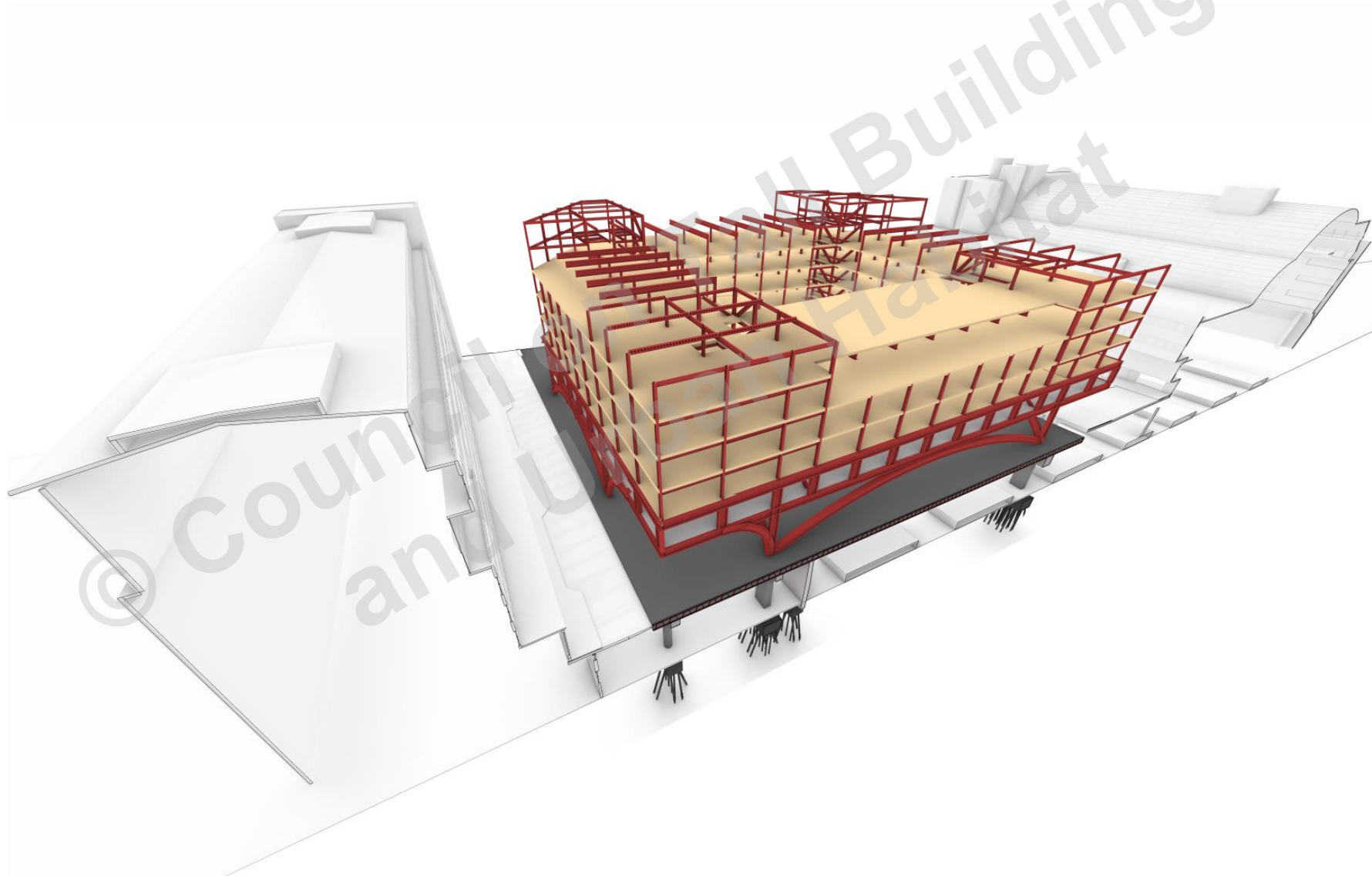
Arched Platform Installation – Composite Slab





## Feasibility & the Way Forward

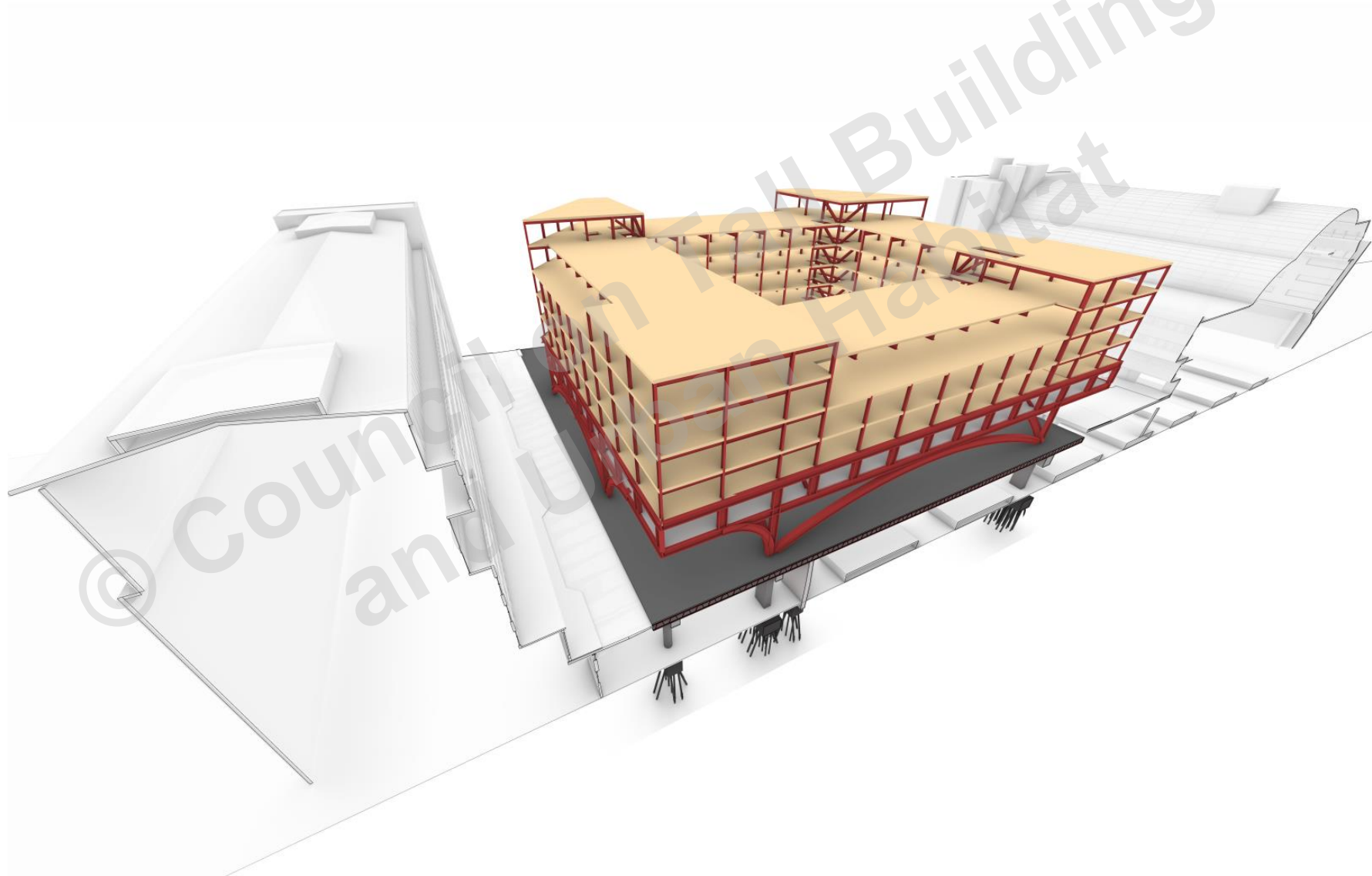
### Hybrid Steel-CLT Superstructure





## Feasibility & the Way Forward

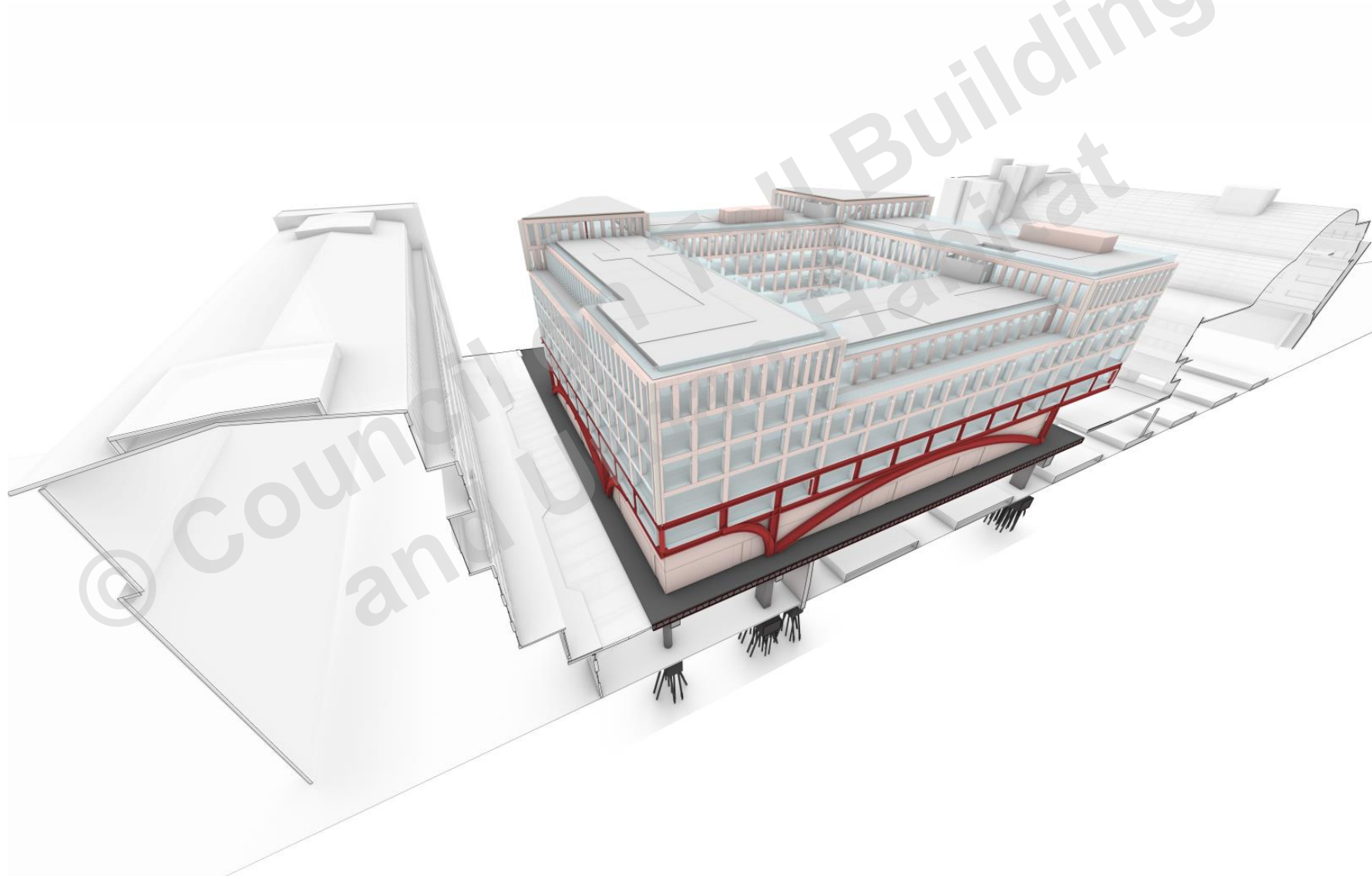
### Superstructure Installation





## Feasibility & the Way Forward

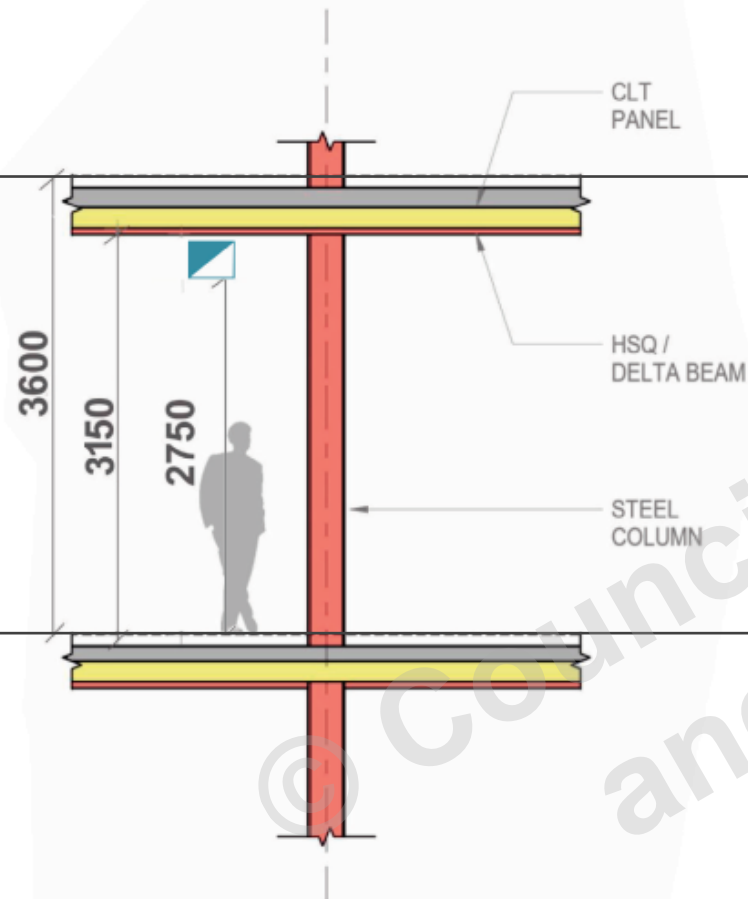
Façade Installation & Fit-out





# Feasibility & the Way Forward

## Hybrid Steel-CLT Superstructure



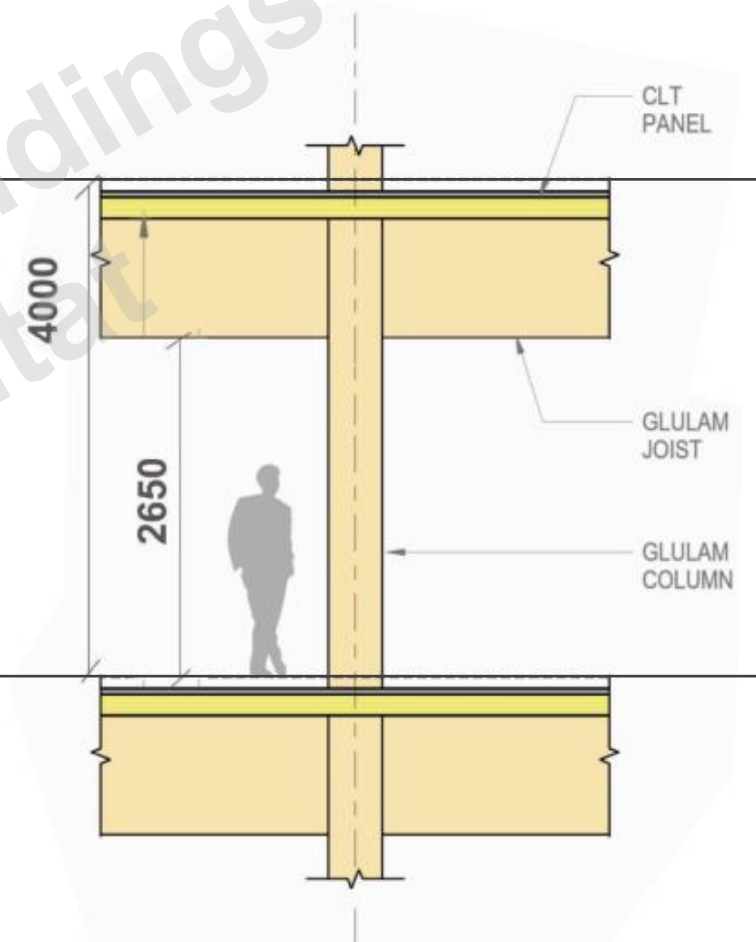
**COMPOSITE : HSQ / DELTA BEAM**

COLUMN SPACING: 6m MAX

500mm more  
floor-to-structure

400mm less  
floor-to-floor

**1 additional  
floor per block**



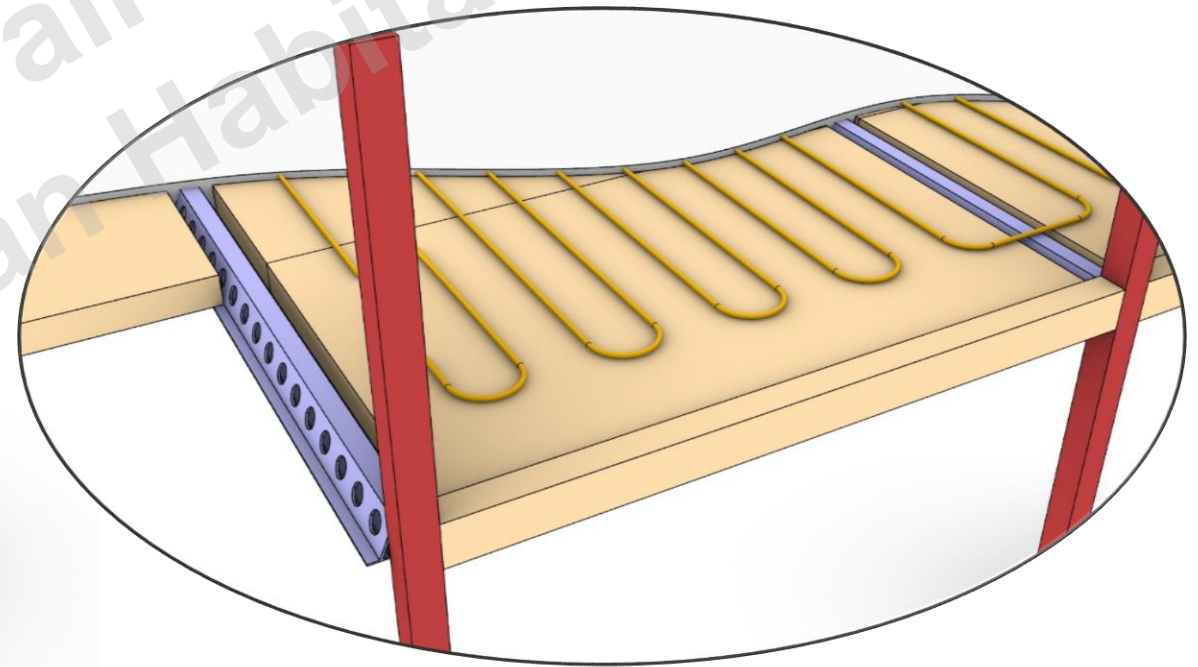
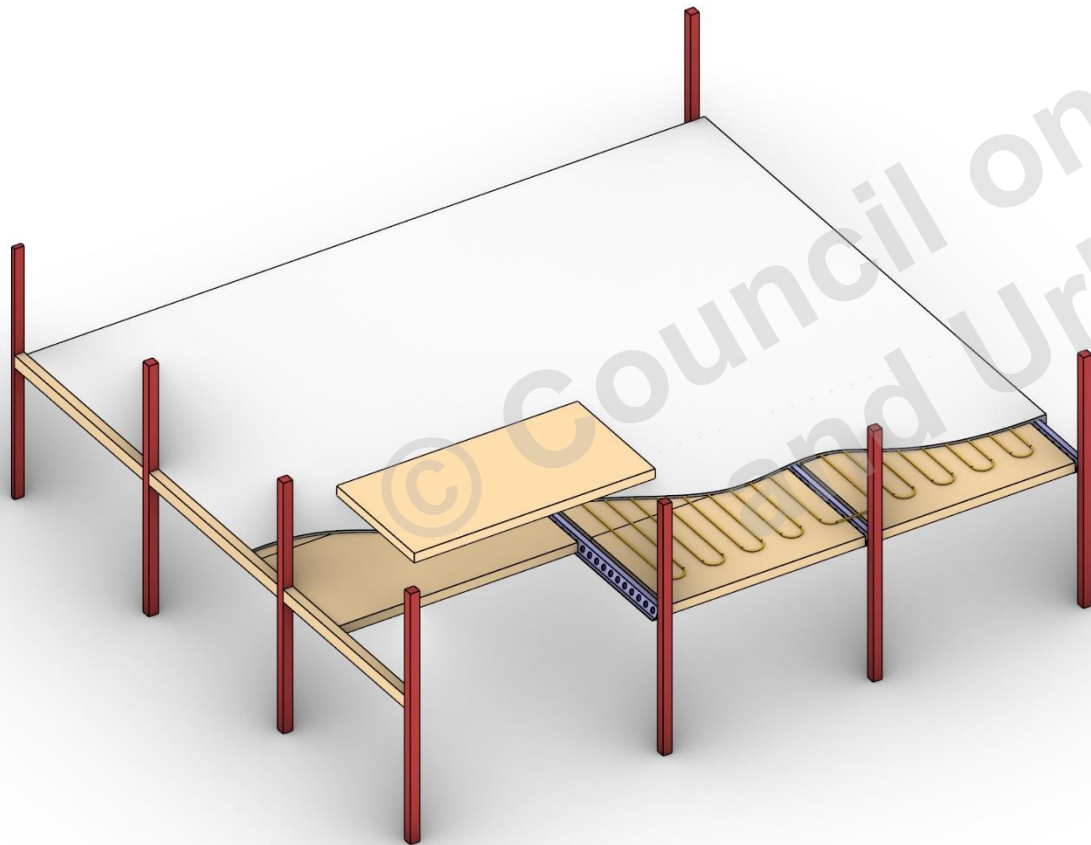
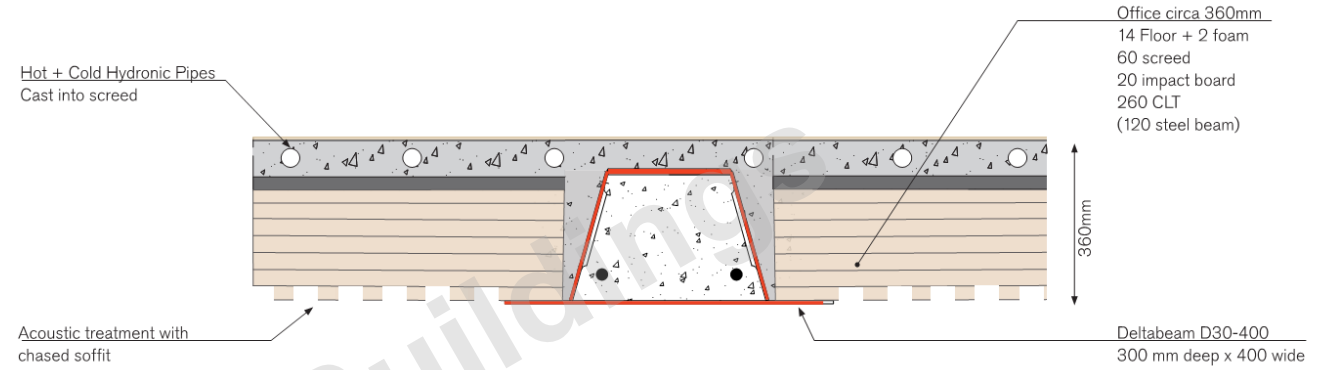
**GLULAM : NO GIRDERS**

COLUMN SPACING: 6m MAX



# Feasibility & the Way Forward

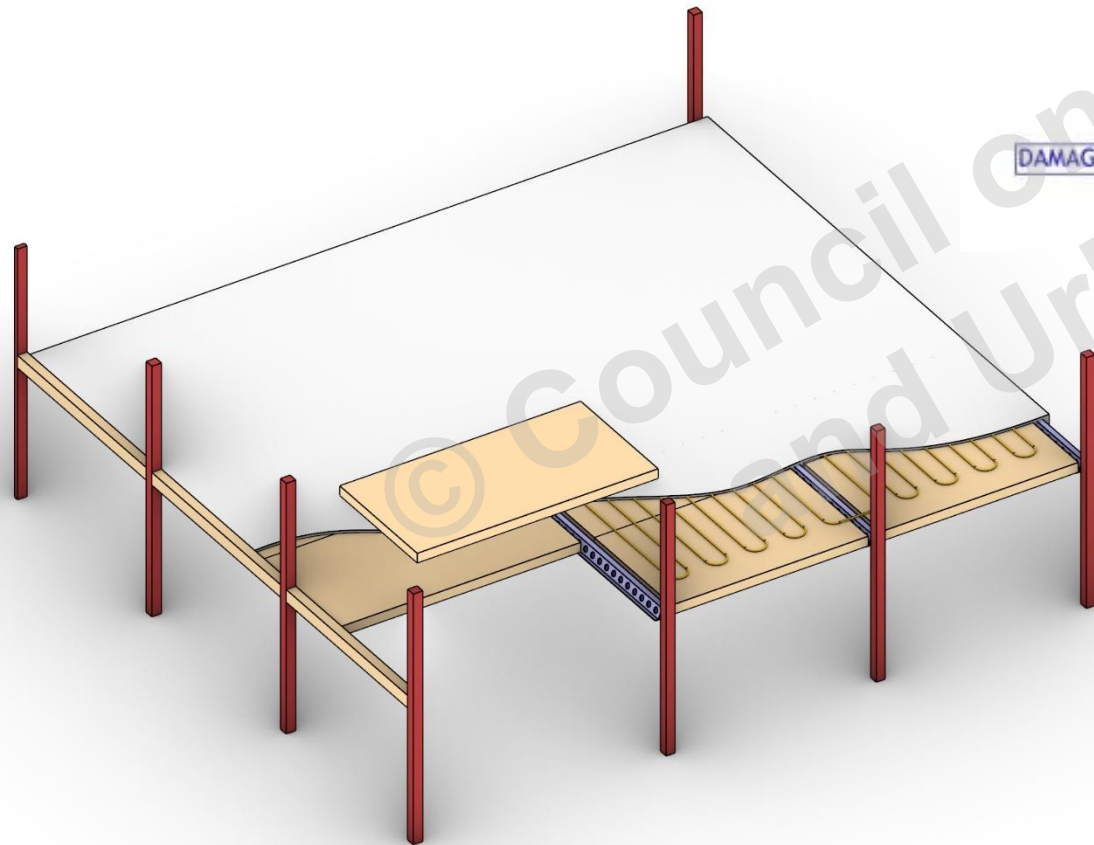
## Hybrid Steel-CLT Superstructure





## Feasibility & the Way Forward

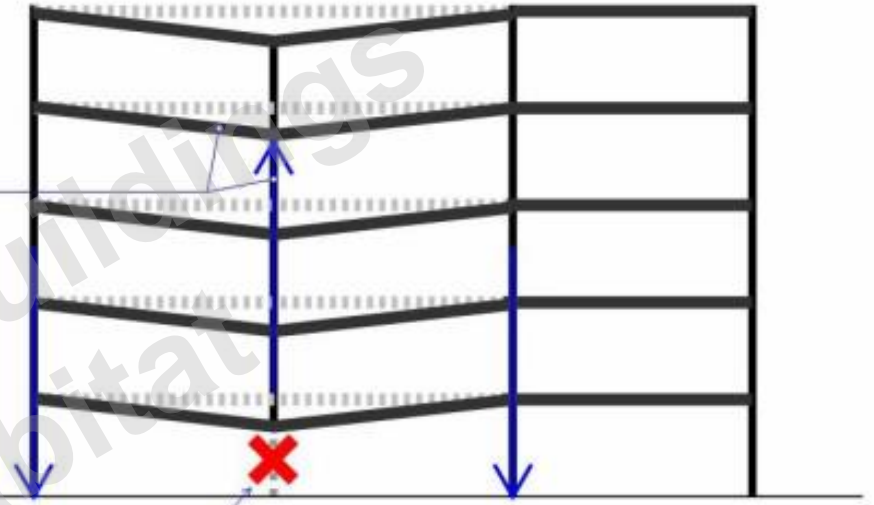
Hybrid Steel-CLT – Resiliency



ALTERNATE LOAD PATH PROVIDED  
THROUGH COLUMN TENSION SPLICES  
AND CATENARY ACTION

DAMAGED OR DESTROYED COLUMN

BUILDING FRAME ELEVATION





# Proposal

## The Southern Entrance





End

© Council on Tall Buildings  
and Urban Habitat