

# Portal Structure Design

**You said:** "The important issue for us is to get the right balance to achieve minimal noise, visual and environmental impact."

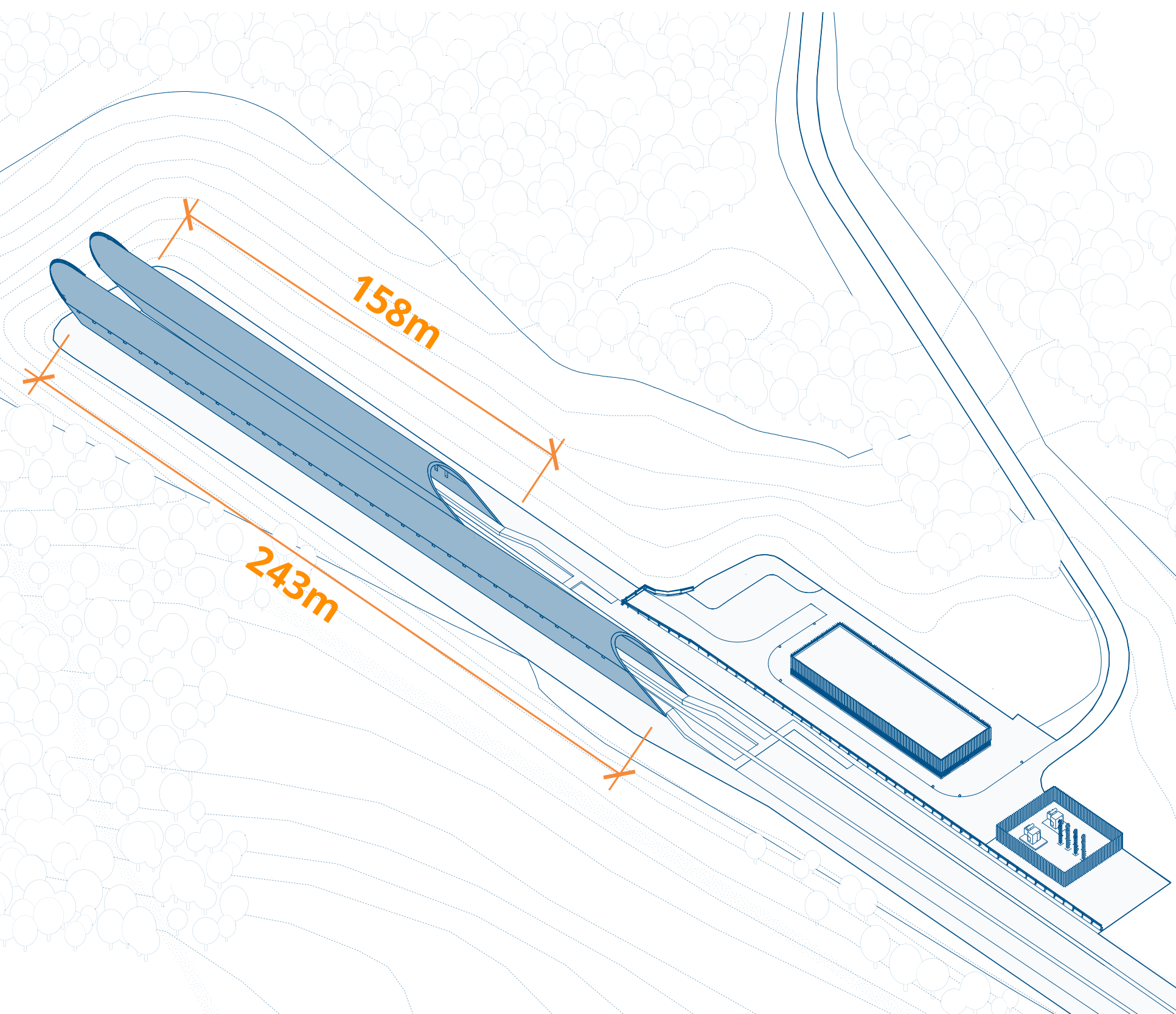
"Has there been any thought into the 'Boom' when the train enters the tunnel at 200mph, generated by the soundwave air pressure?"

**We did:**

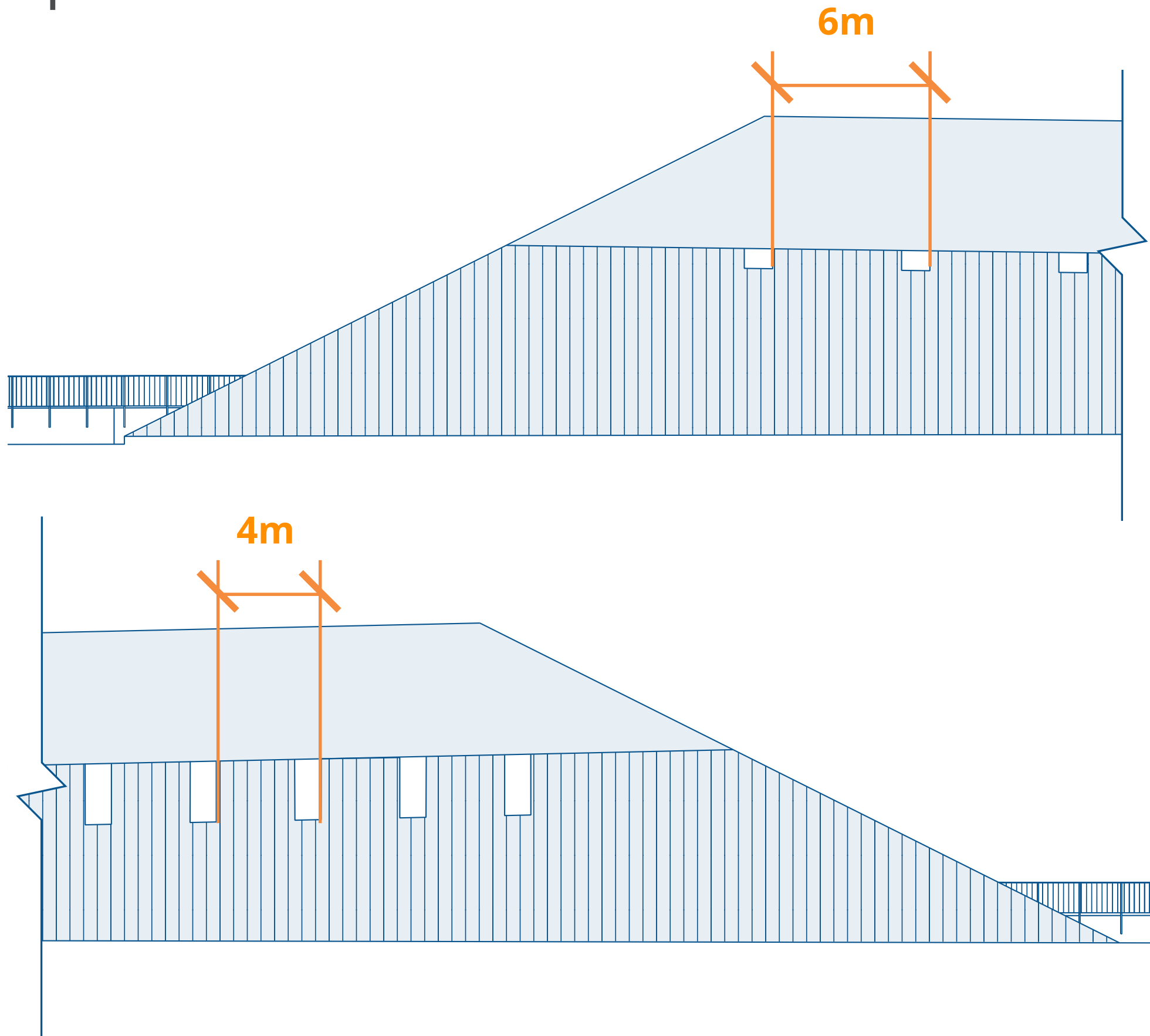
## Design the portals to minimise noise impacts

The curved hood and staggered arrangement of the portal structures reduce noise associated with trains entering and exiting the tunnels.

The tapered shape and the perforations along the sides of the portal structures allow air pressure created by passing trains to dissipate, mitigating the operational noise.



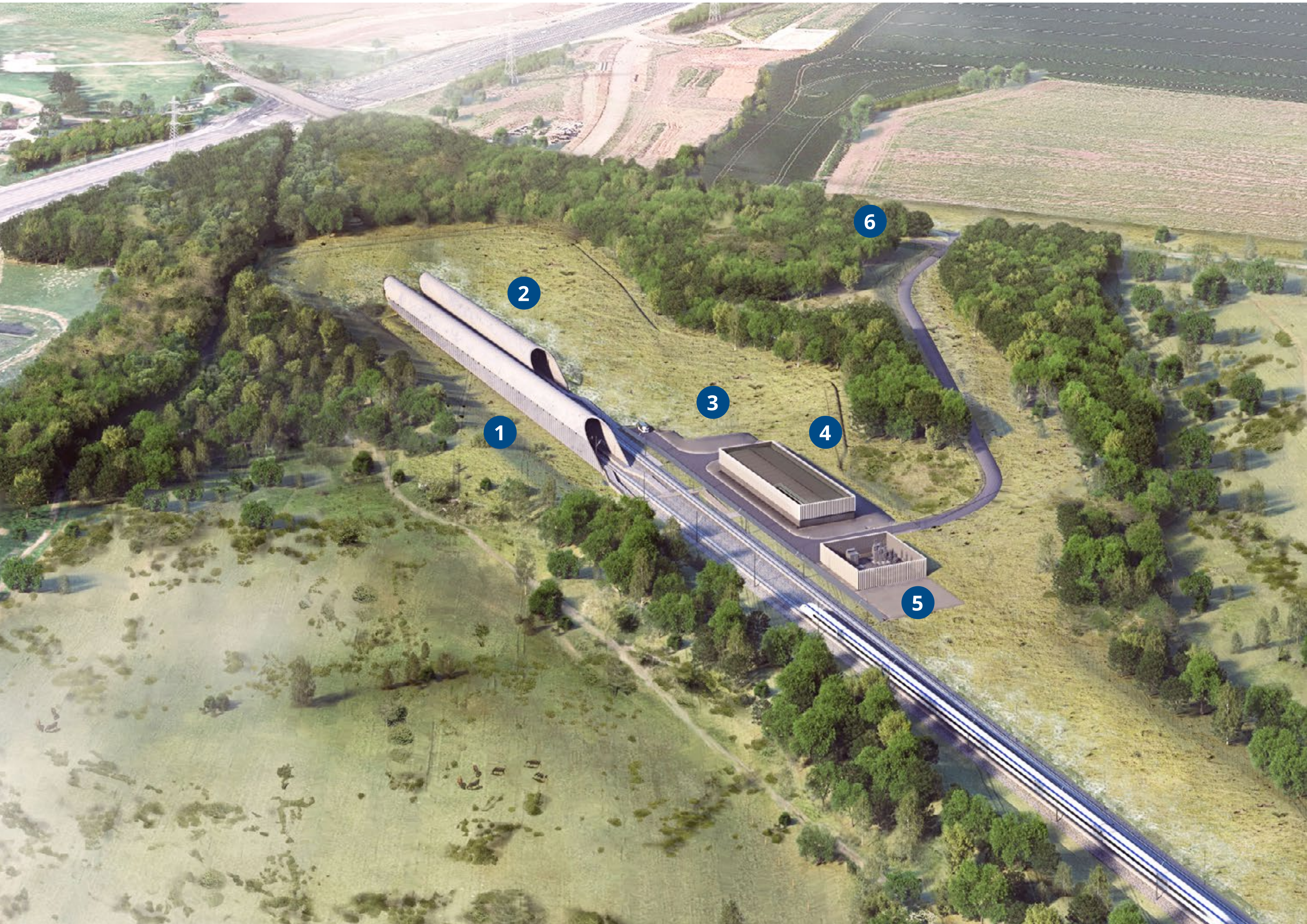
3D view - Portal structure and building



Proposed elevations - Portal structure

### Key

- |   |                                     |   |                             |
|---|-------------------------------------|---|-----------------------------|
| 1 | Portal 1 - Chiltern tunnel entrance | 4 | Portal building             |
| 2 | Portal 2 - Chiltern tunnel exit     | 5 | Auto transformer station    |
| 3 | Portal compound                     | 6 | Portal compound access road |



Visualisation - Aerial view of the Western Valley Slopes looking north (Year 15)



# Portal Structure Design

**You said:** “Please try and integrate with landscape.”

“The portal structures will be large and difficult to hide. There should not be major landscaping to hide them. Make them elegant.”

**We did:**

## Design the portal to sit elegantly in the landscape

The portal structures are finished using smooth and textured concrete. Introducing texture at low level will ground the portals within the landscape.

The portals are considered as part of the family of structures along the HS2 route through the Chilterns and Colne Valley. They share a common language with the material treatment for the Colne Valley Viaduct and Tilehouse Lane Overbridge.

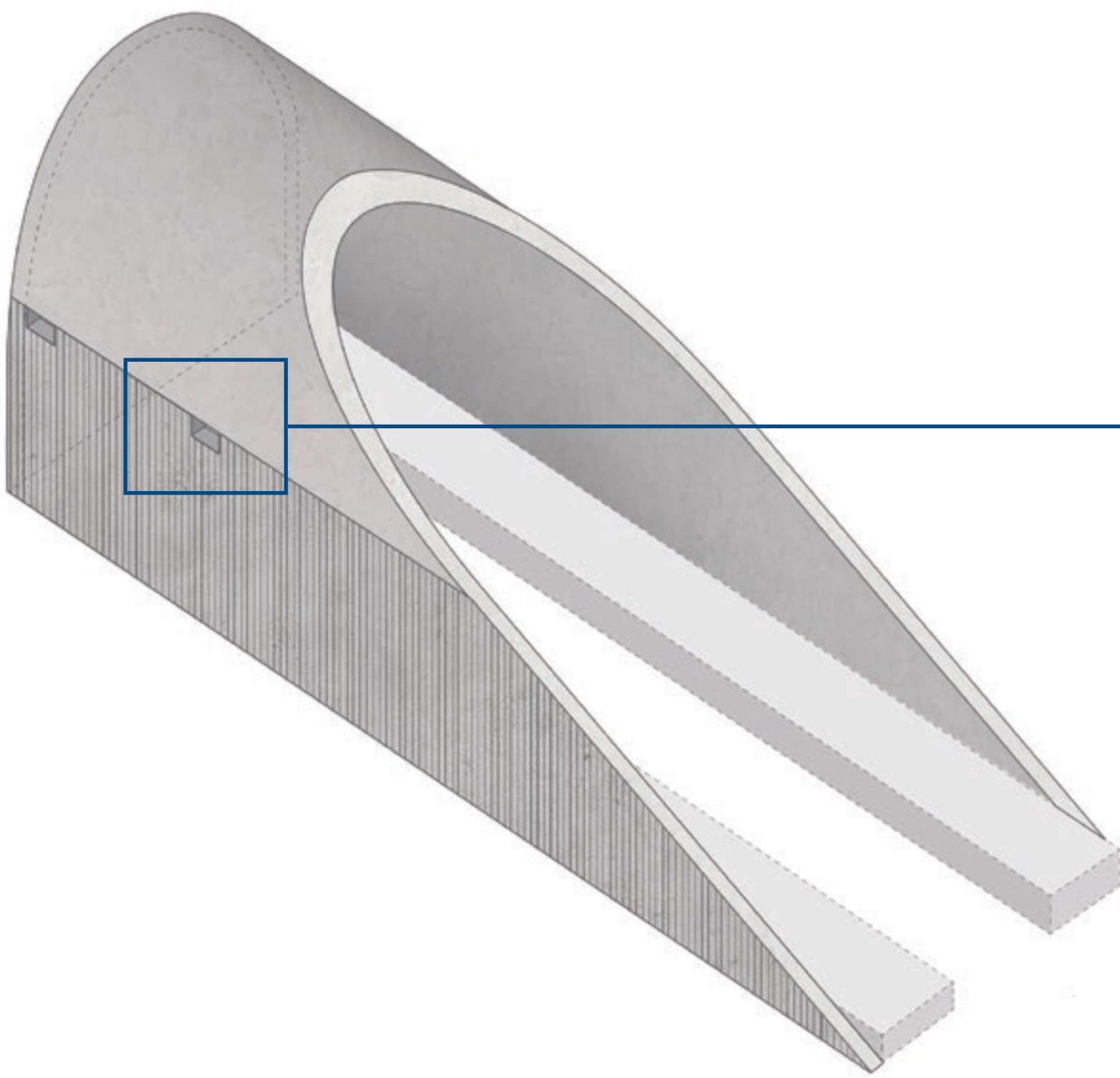


Diagram - Portal entrance profile

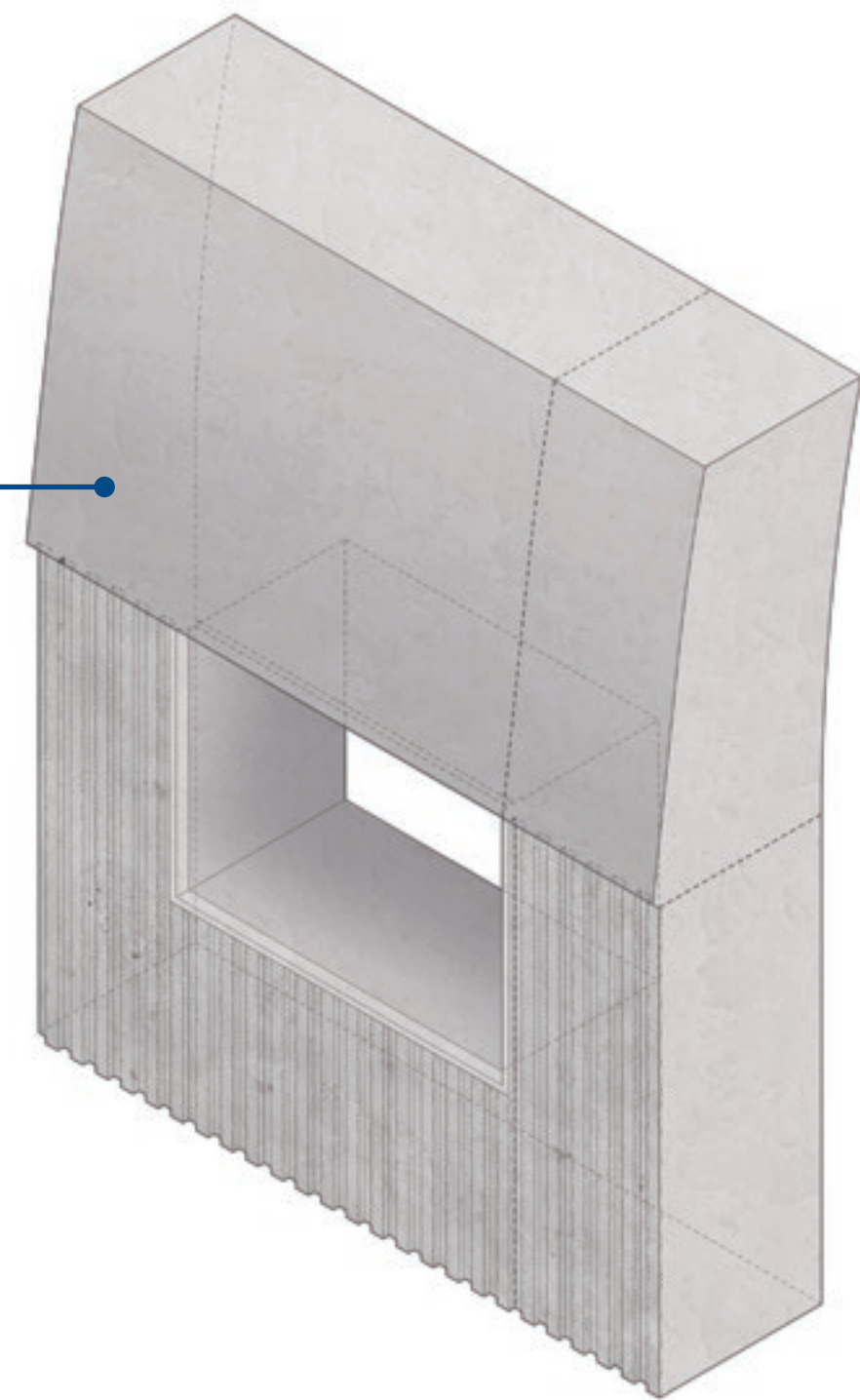


Diagram - Portal structures perforation detail

## Common design details



Colne Valley Viaduct



Tilehouse Lane Overbridge



South Portal



Visualisation - Public footpath view looking north (Year 15)



# Portal Structure Design



Visualisation - View from public footpath looking north-east (Year 15)



# Portal Building Design

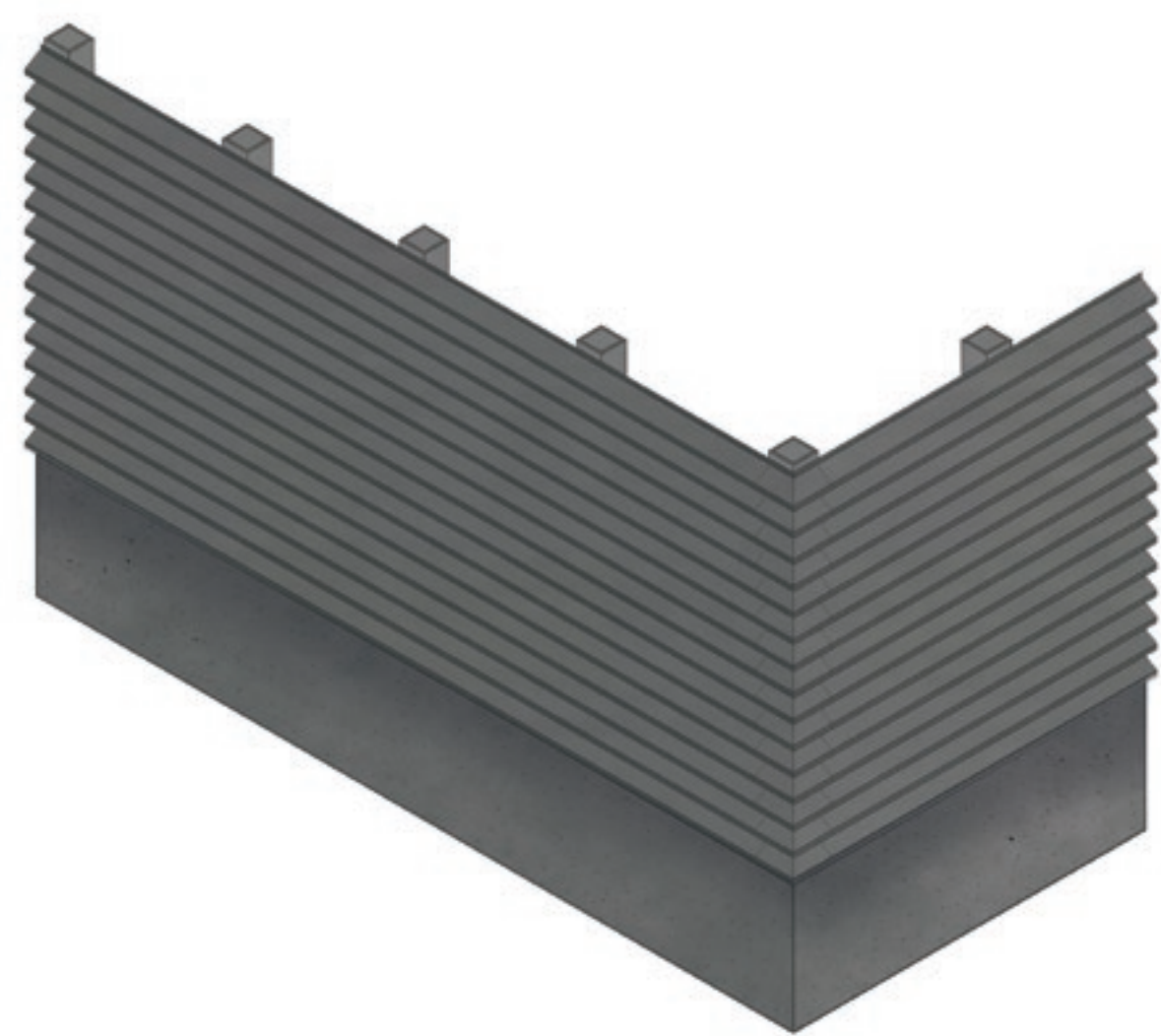
**You said:** “Hide it and where visible make it look good.”  
“Please try and integrate with landscape.”  
“Make it elegant.”

**We did:**

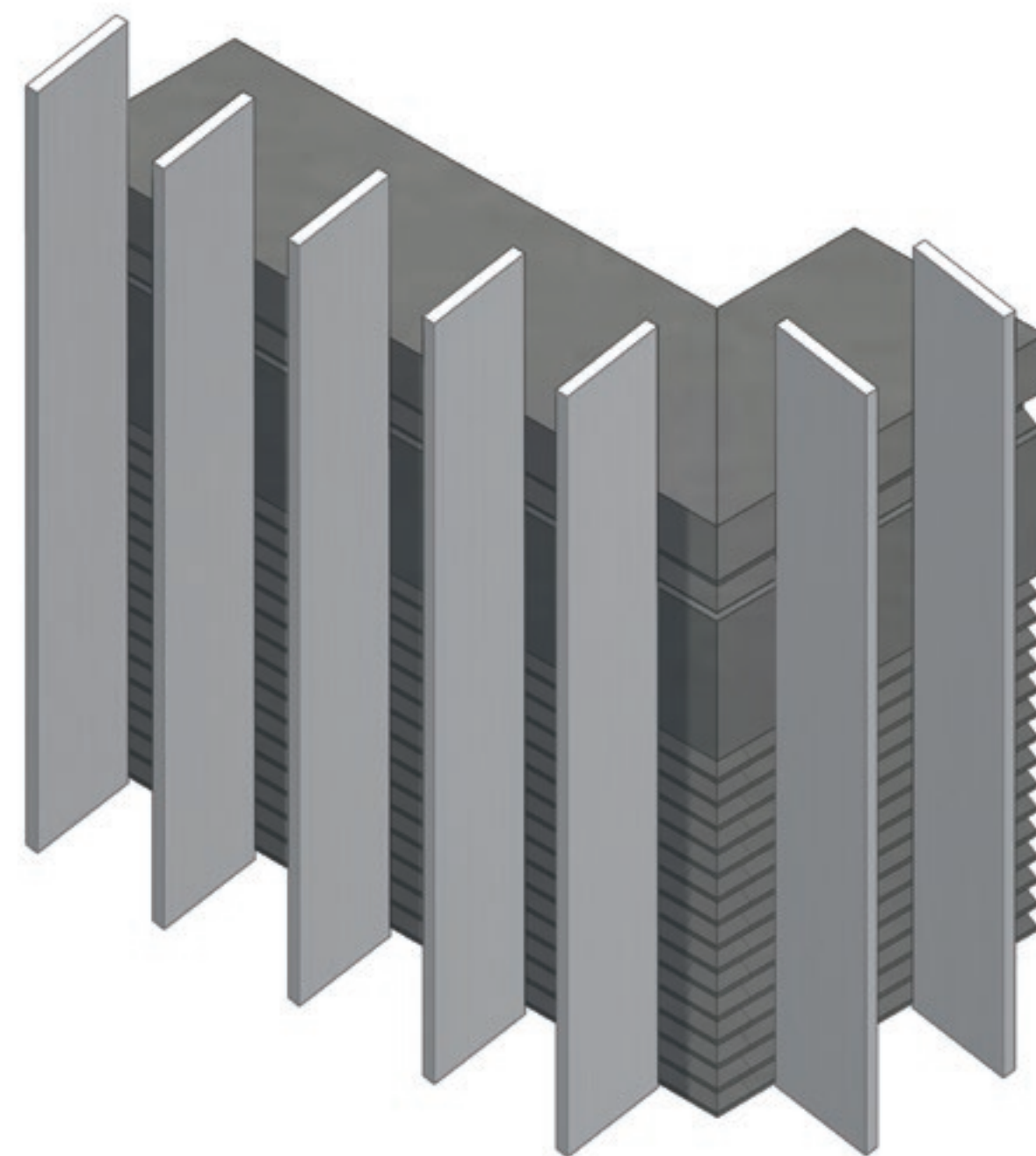
## Design the building as a simple object in the landscape

The portal building accommodates mechanical and electrical plant equipment and has been kept as compact as possible. It is conceived as a simple object within the landscape, designed not to distract from the portal structures.

The building is clad in dark grey steel louvres, wrapped by a band of vertical anodised aluminium fins. Doors and openings are concealed within the louvred facade to simplify its appearance and reduce perceived scale.



1 3D detail - Horizontal louvres



2 3D detail - Vertical fins

Diagram - Compound building key details



Proposed elevation - Portal structure and building



Visualisation - Elevated view of the portal structure and building (Year 15)



# Portal Structure and Building Visibility

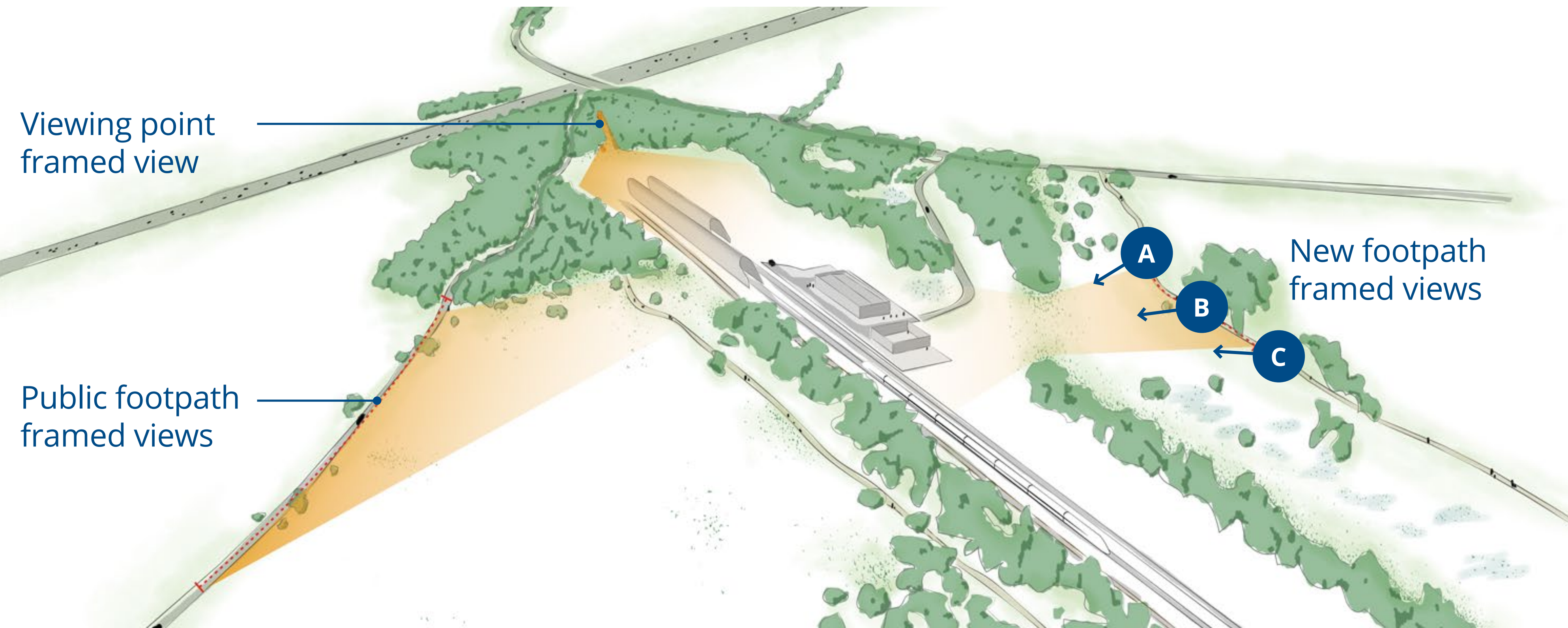
**You said:** “Hide it and where visible make it look good.”  
“Please try and integrate with landscape.”  
“Make it elegant.”

**We did:**

## Screen long-distance views but frame closer 'snapshot' views

The portal structure and building are designed to be screened with landscape earthworks and tree cover to reduce their visibility from long-distance views.

Openings in tree cover at specific locations will enable snapshot views to the portal structure and building. In these locations, low level rail systems equipment will be screened from view.

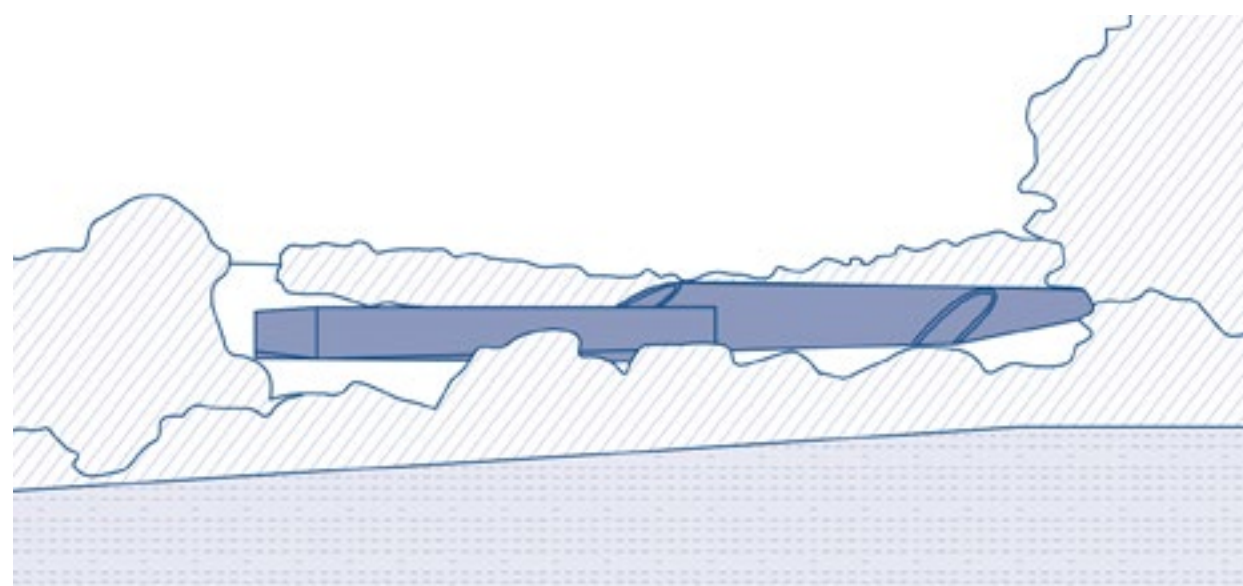


Aerial sketch diagram - Framed views and screening

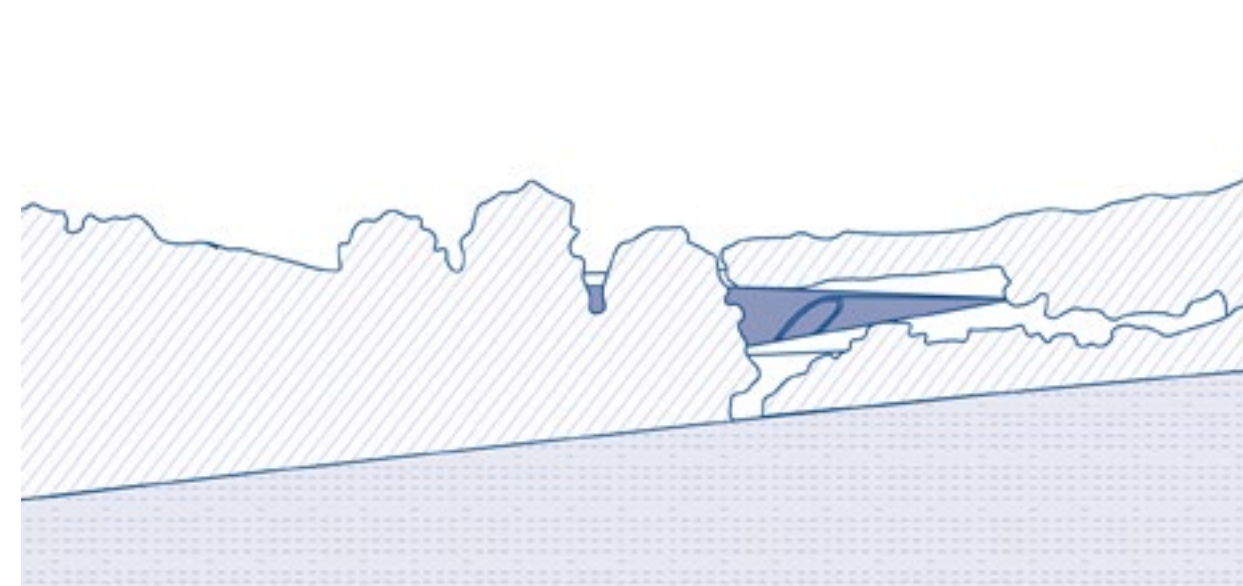
## Visibility from new footpath



View from point A



View from point B



View from point C



Visualisation - View from new footpath (Year 15)



# Portal Structure and Building Visibility



Visualisation - View from viewing platform looking south-east (Year 15)