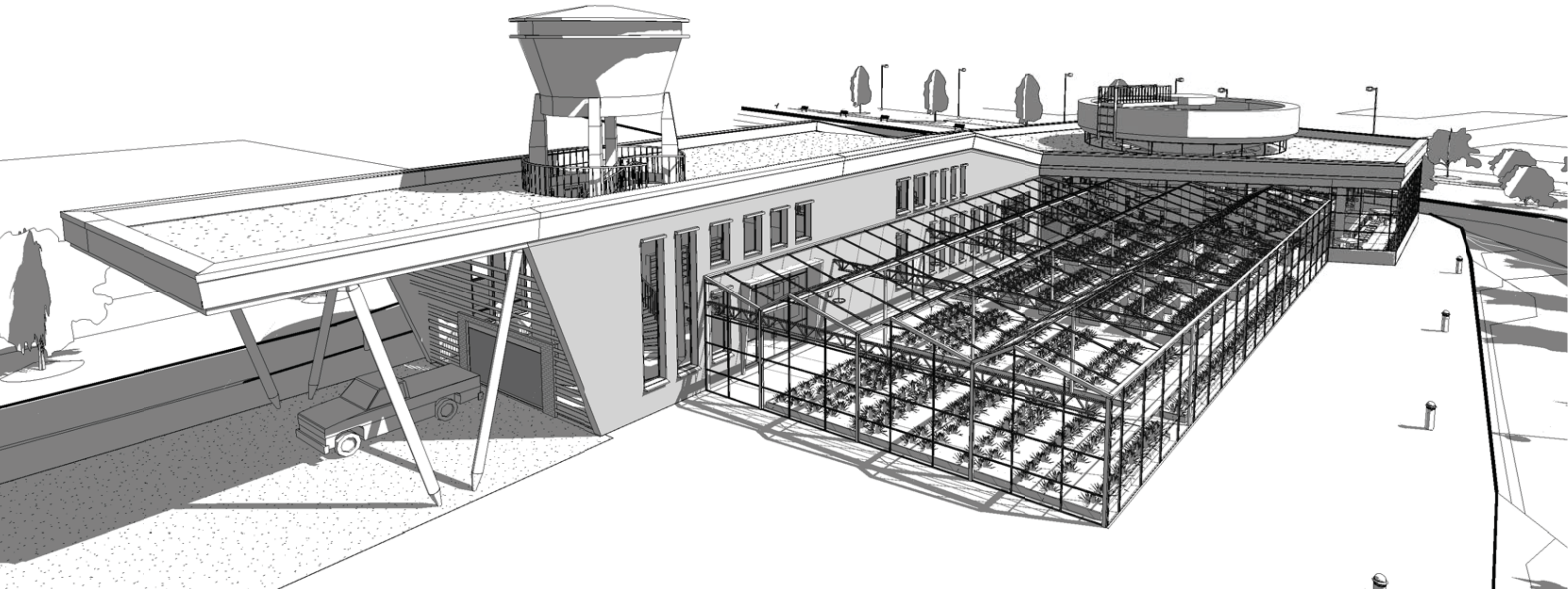


*Why throw away **WASTE** when you can make food out of it?*



ARCHITECTURAL ENGINEERING STUDIO 10

Student: Shuai Min Zhang 1397222
Tutors: T. Homans, M. Meijs and P. Teeuw

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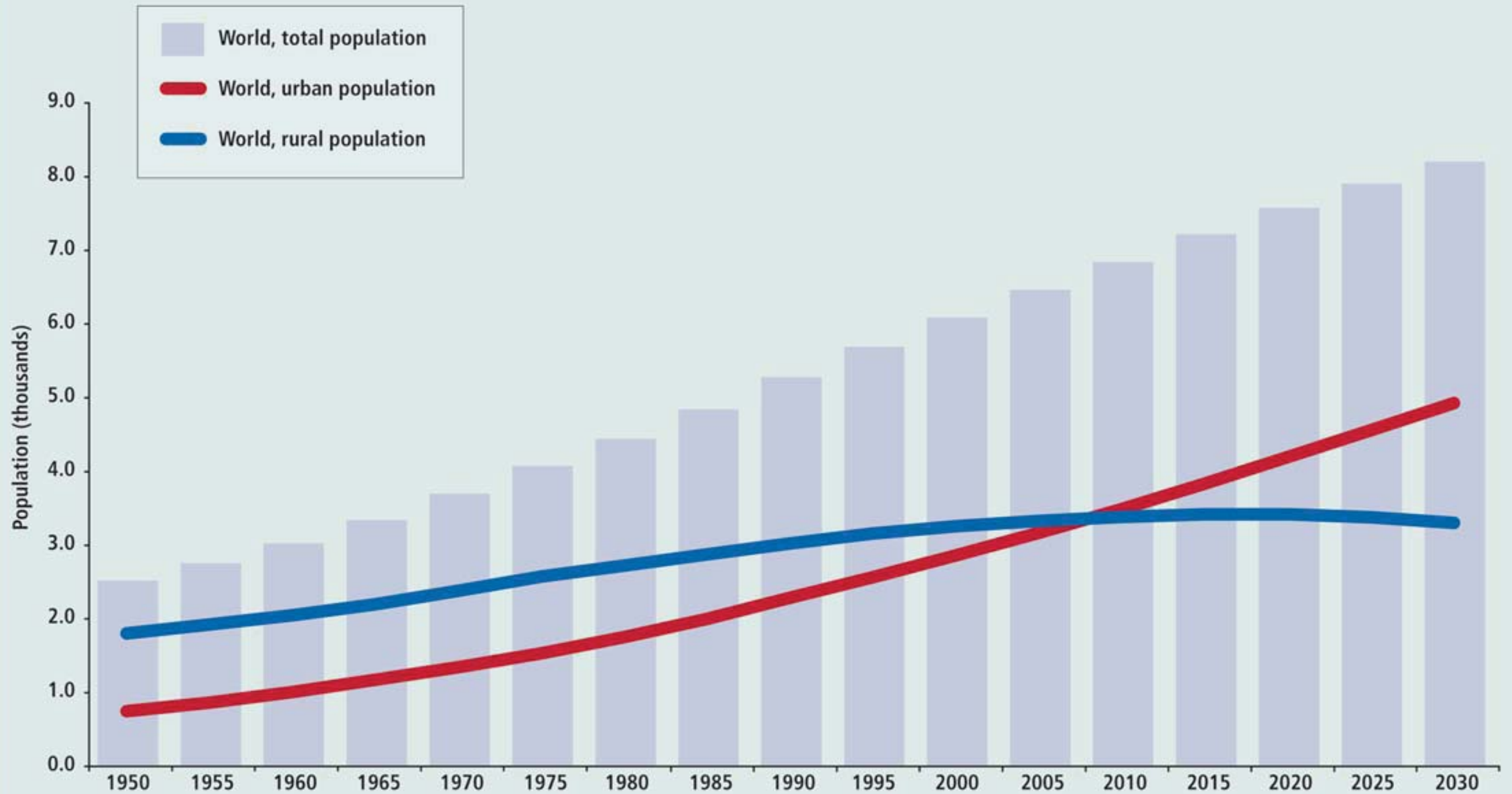
Location

Design

Technical aspects

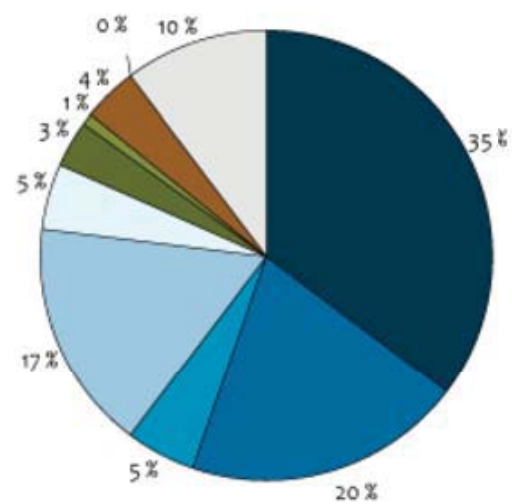
Fascination and problem statement

The urban and rural population of the world, 1950-2030



Samenstelling huishoudelijk restafval

2010



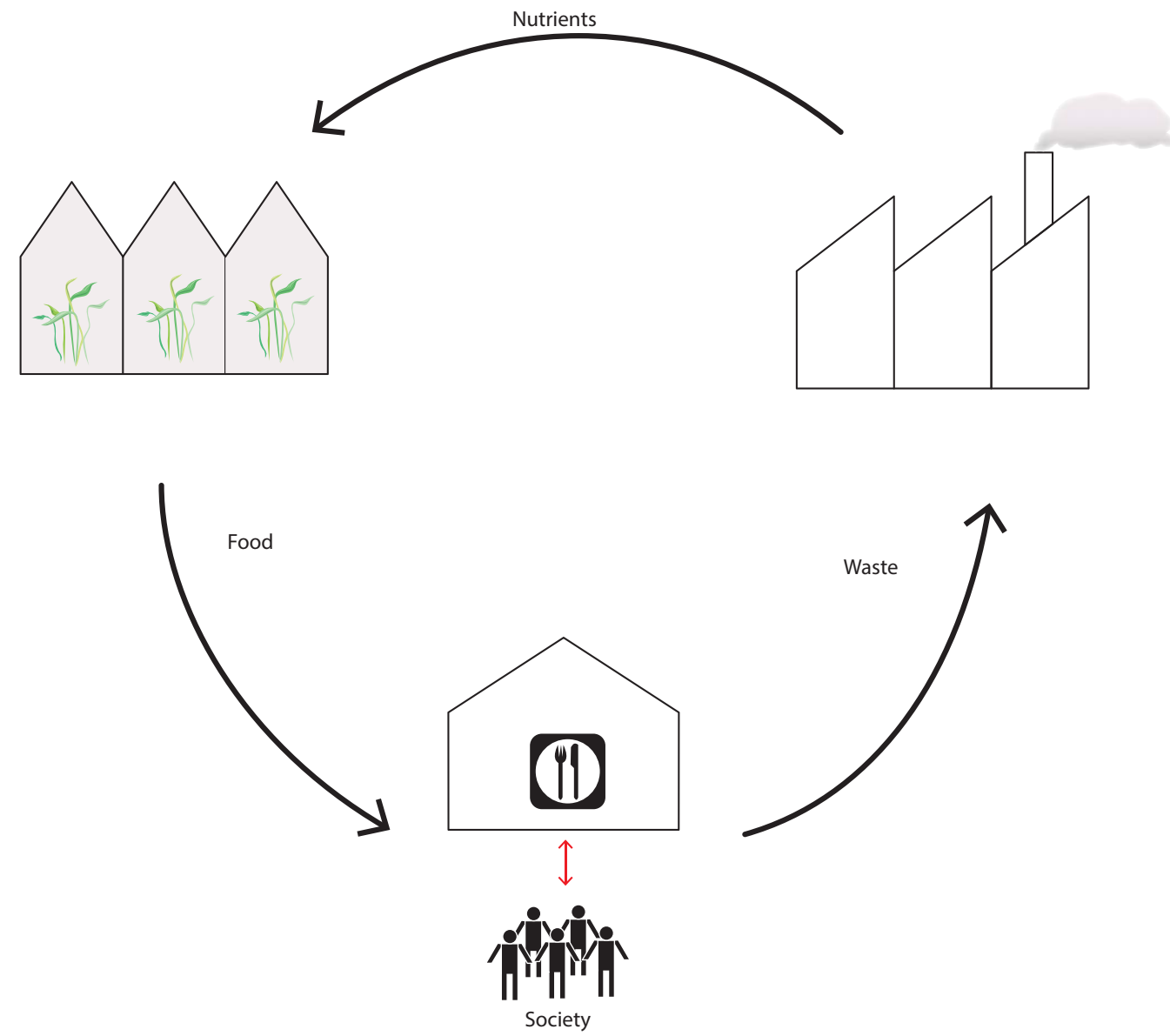
- Gft-afval e.d.
- Papier
- Luiers
- Kunststof
- Glas
- Ferro
- Non-ferro
- Textiel
- KCA
- Overig

Bron: Agentschap NL, CBS.

CBS/meh12/0141
www.compendiumvoordeleefomgeving.nl



Proposed solution

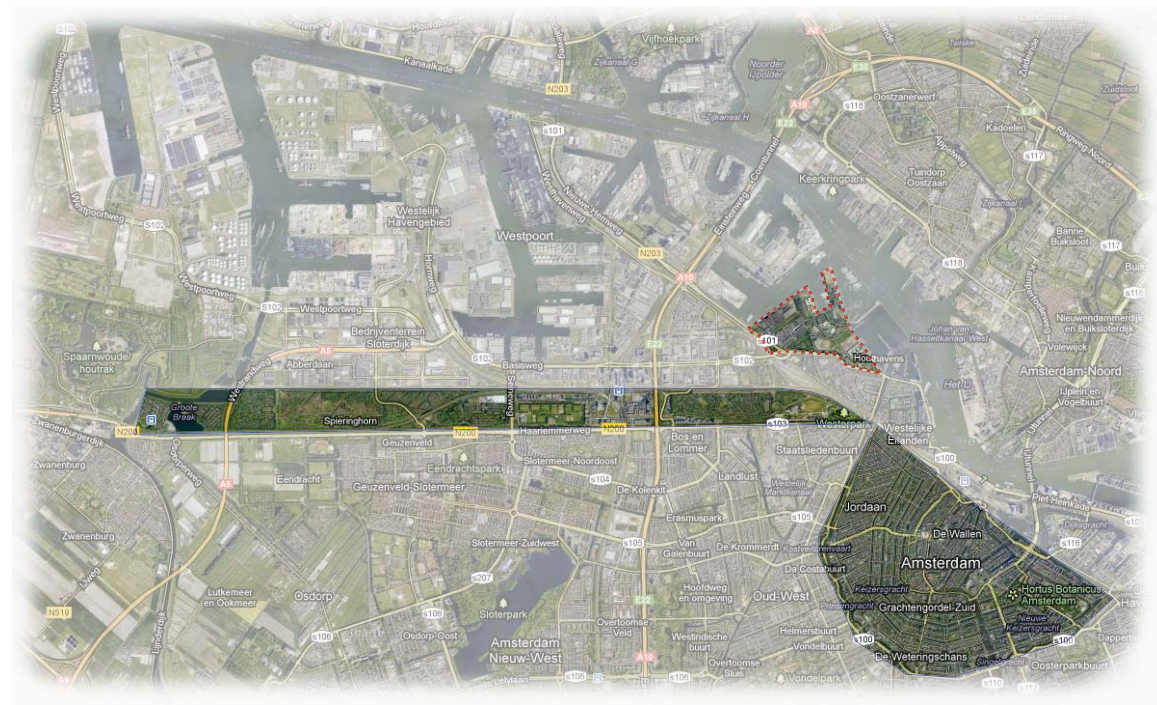


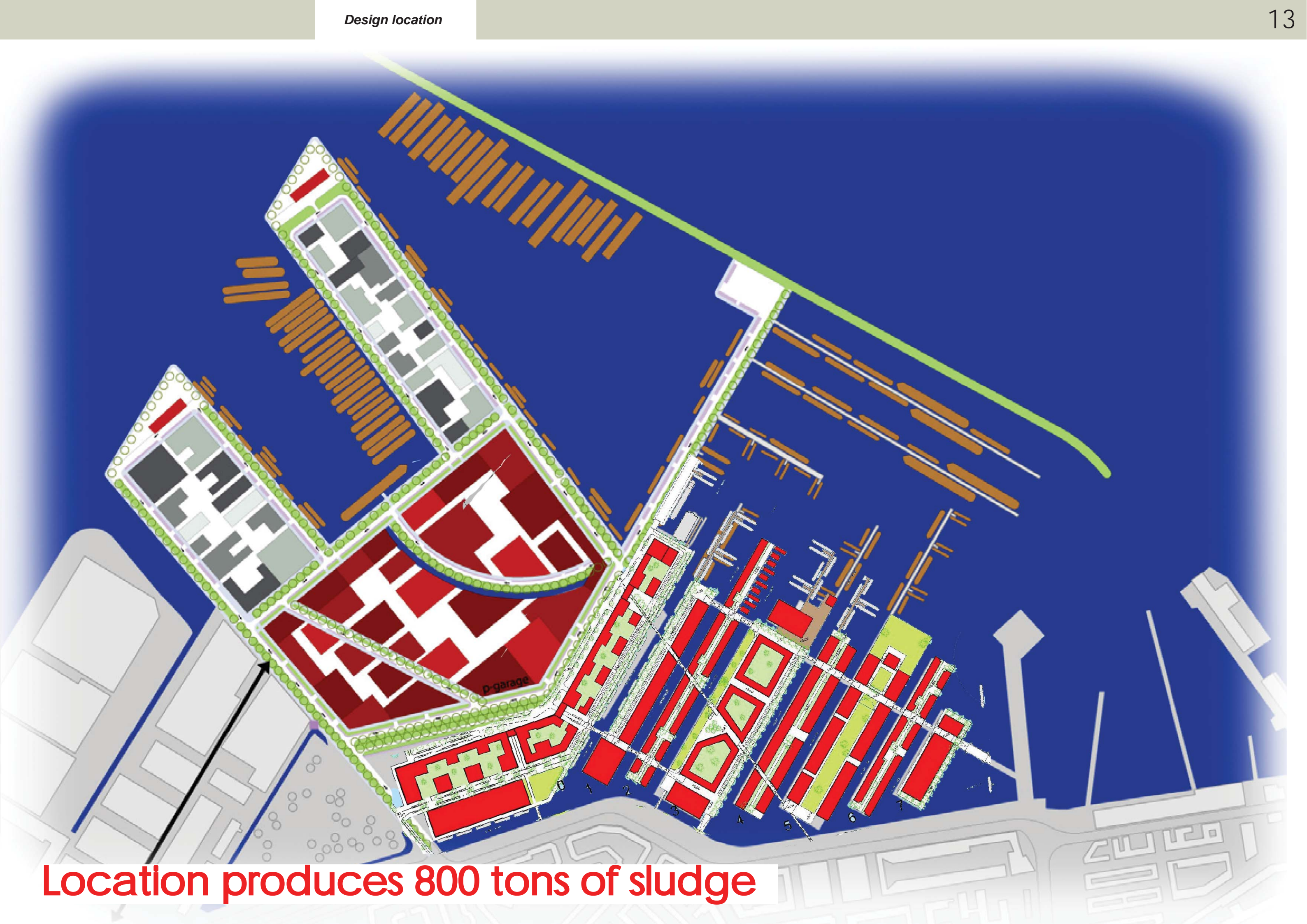




Location:







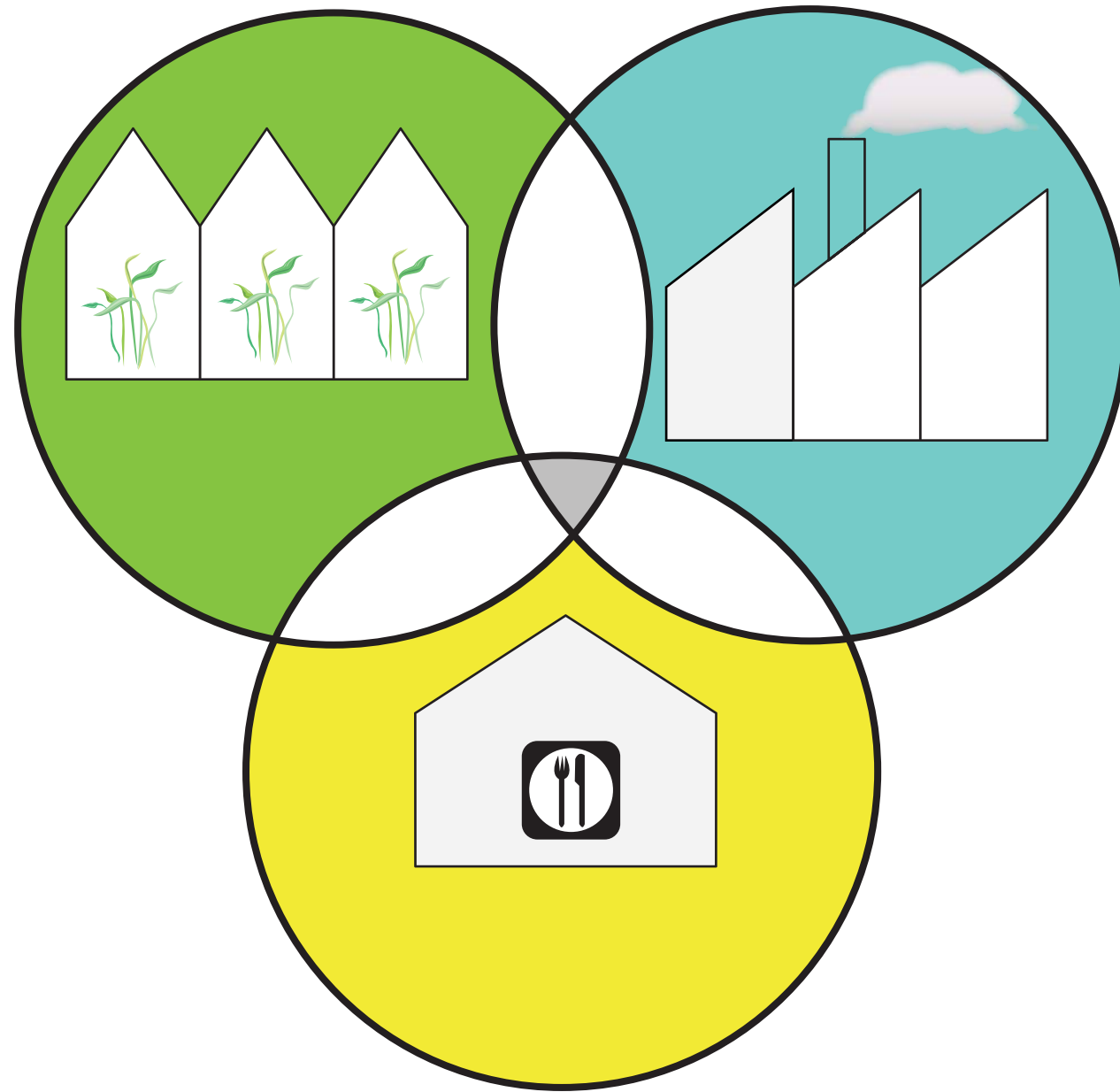
Location produces 800 tons of sludge



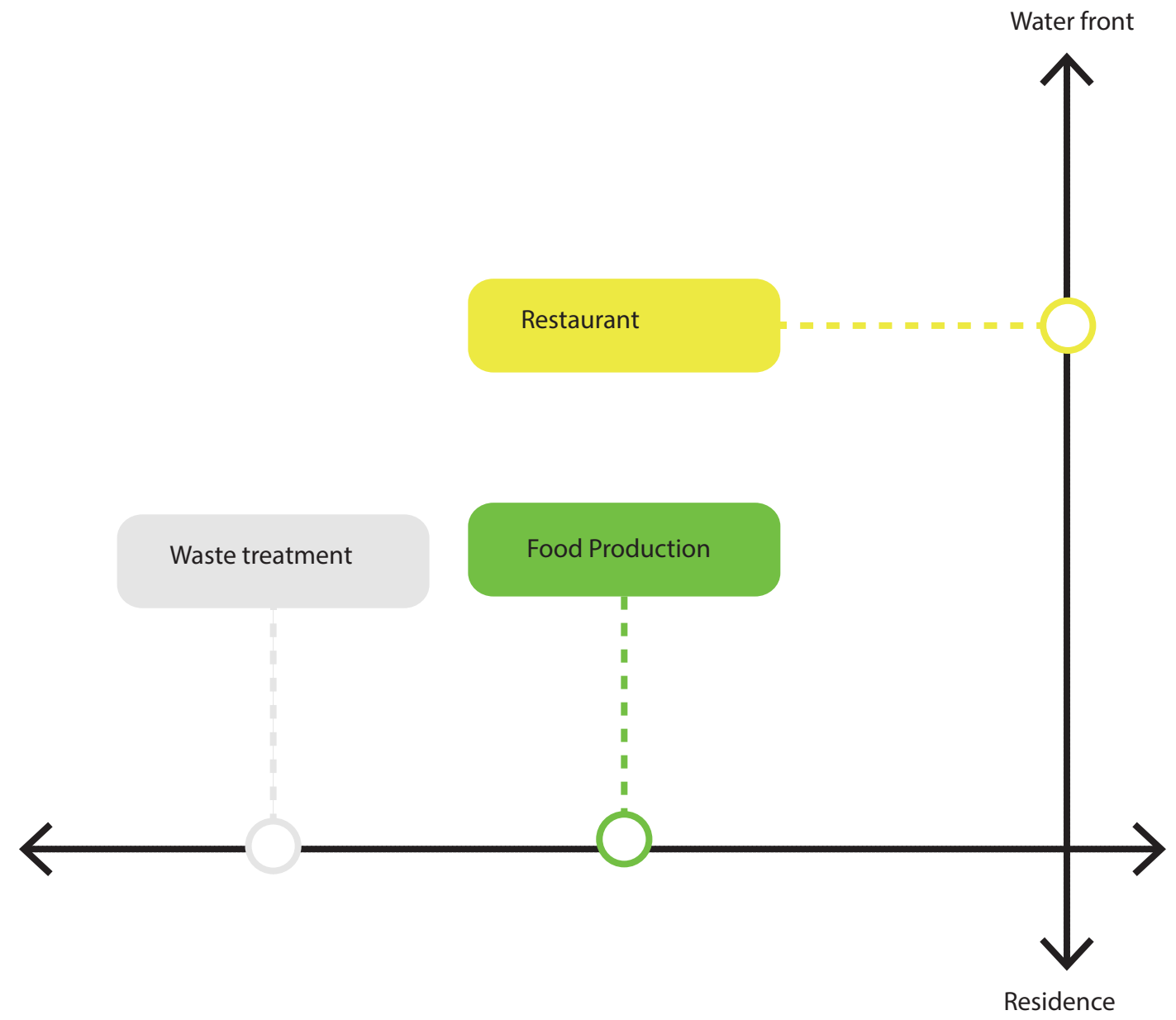
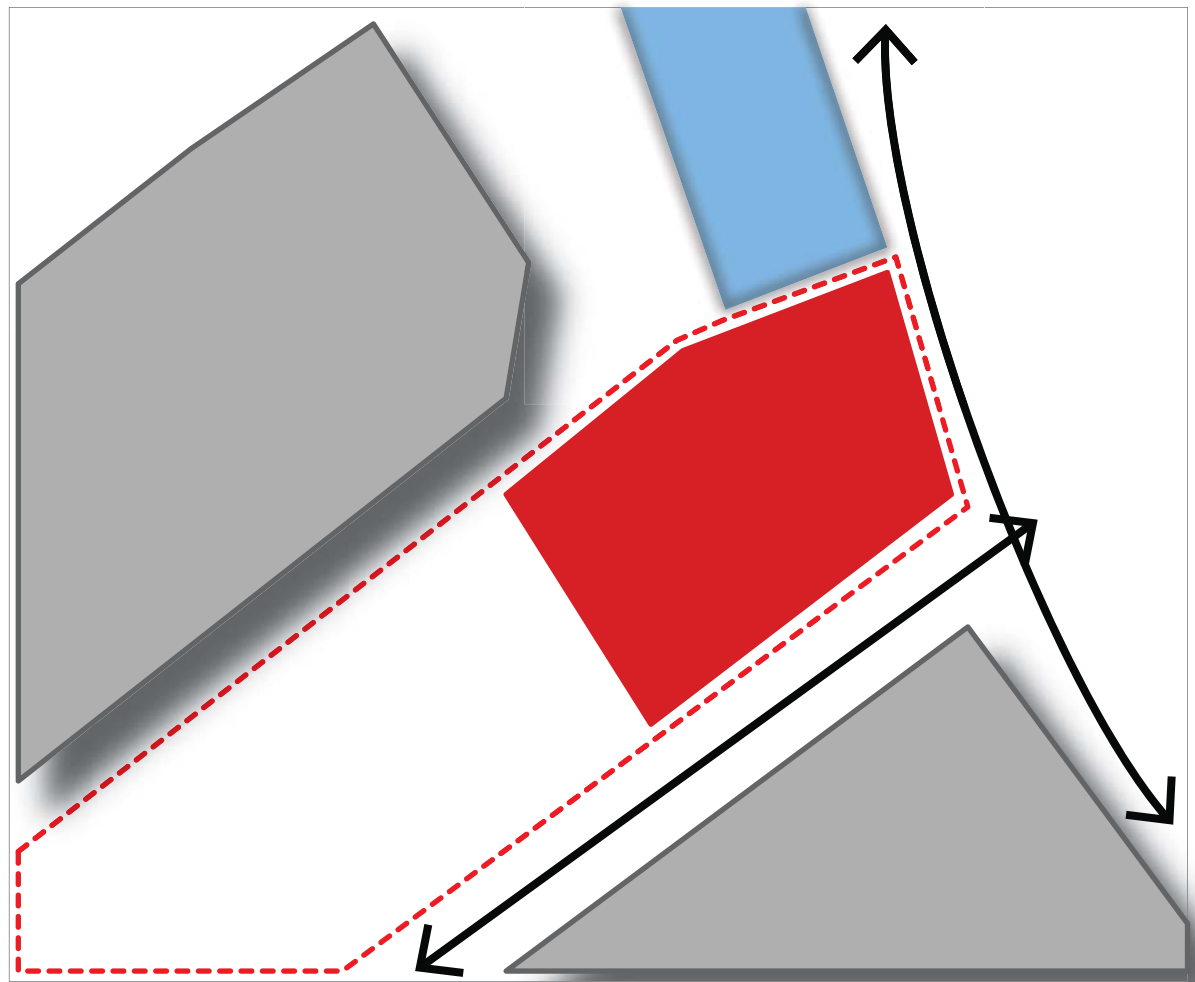
3000 m² Arable land required. 800m² for Greenhouse

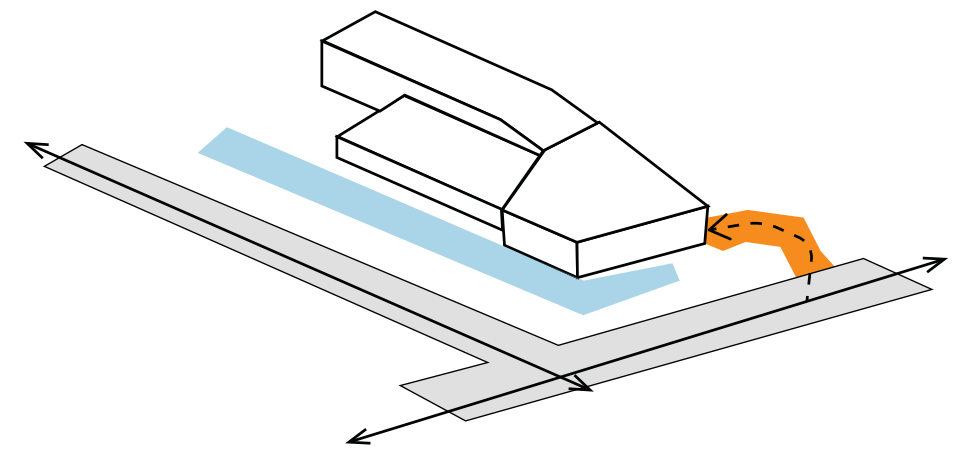


Enough food for 40 pp equals 400m² restaurant

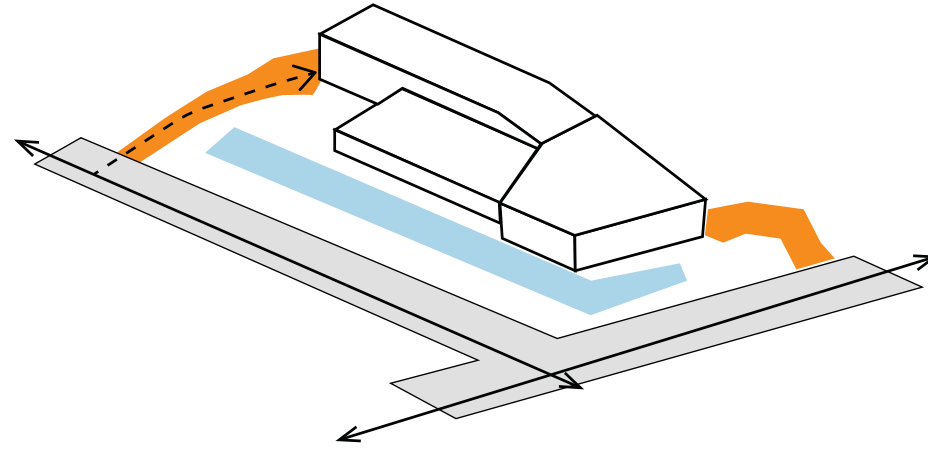


Design

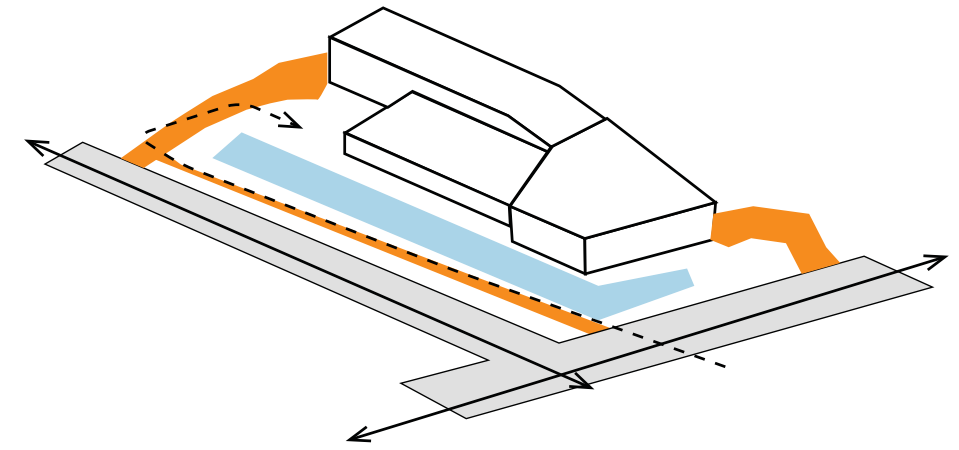




Restaurant

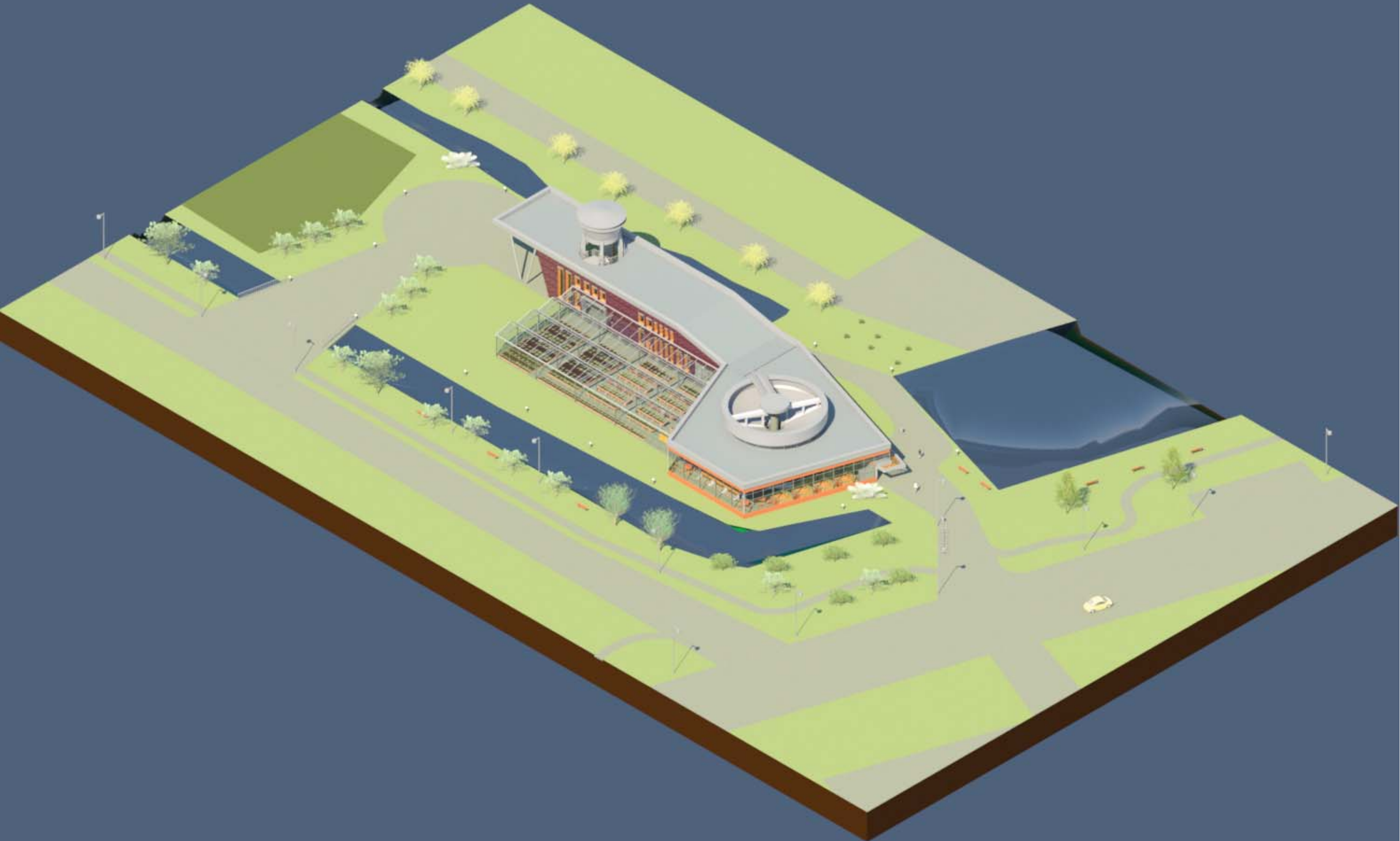


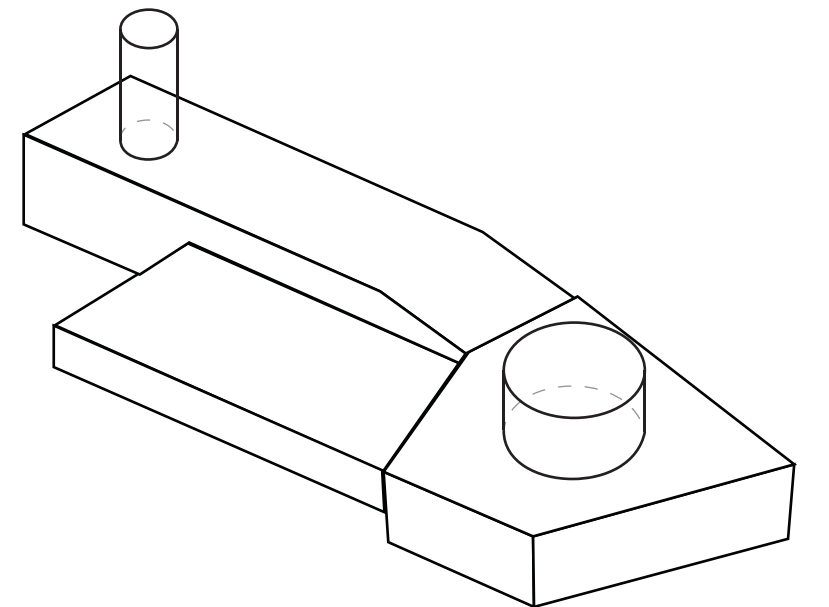
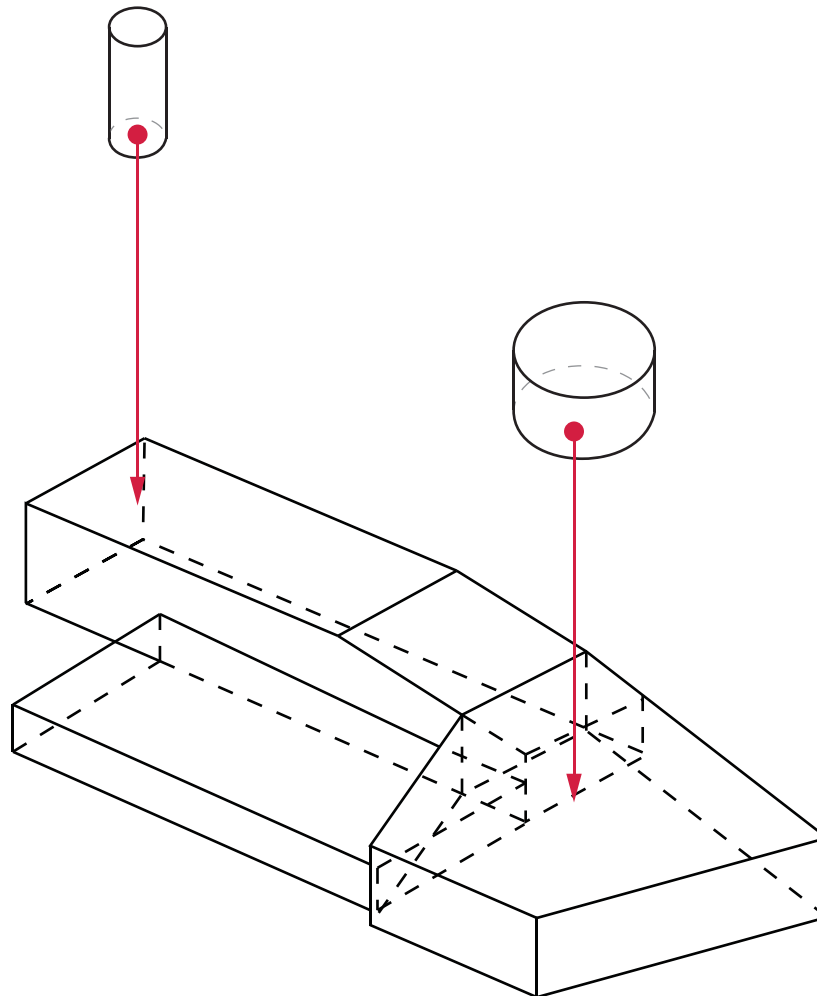
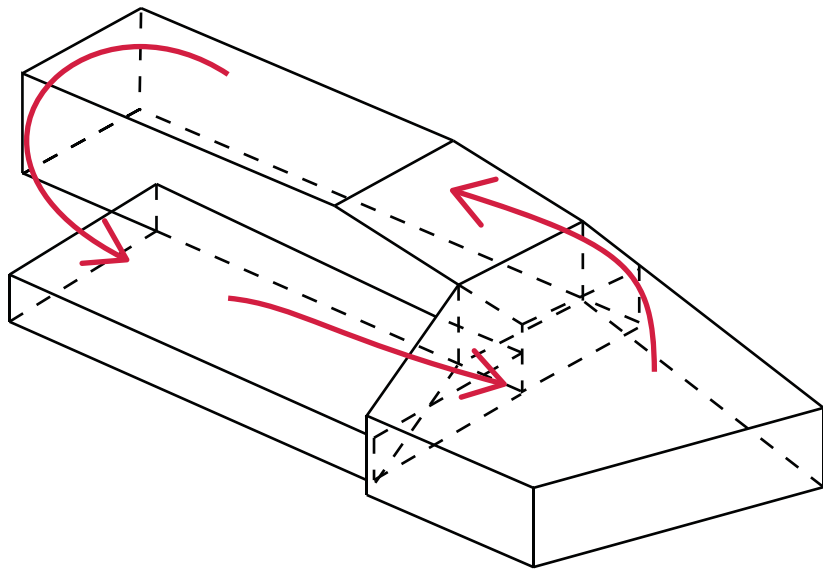
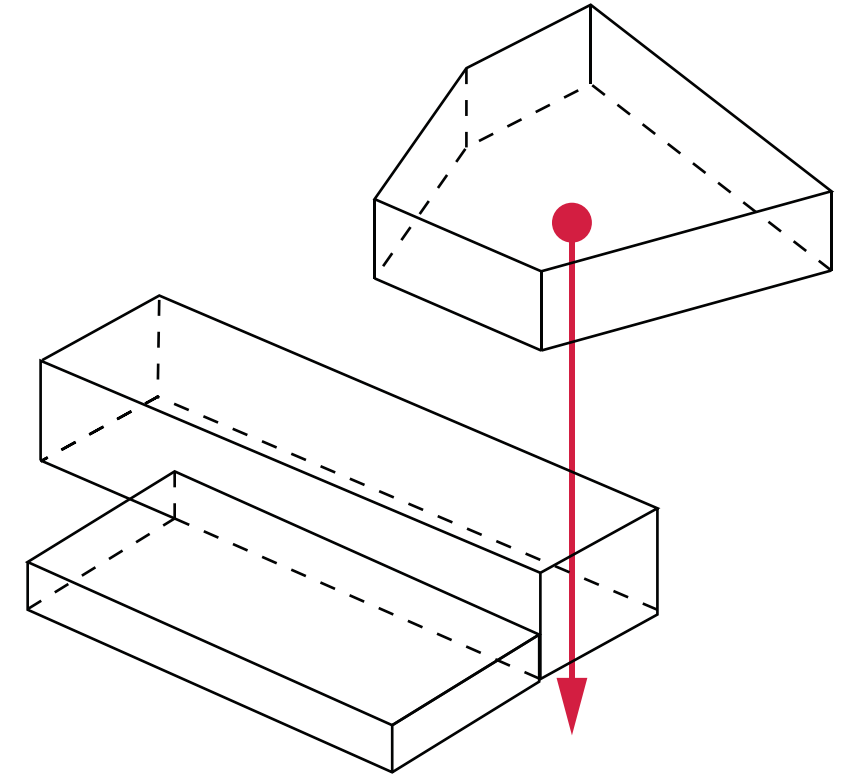
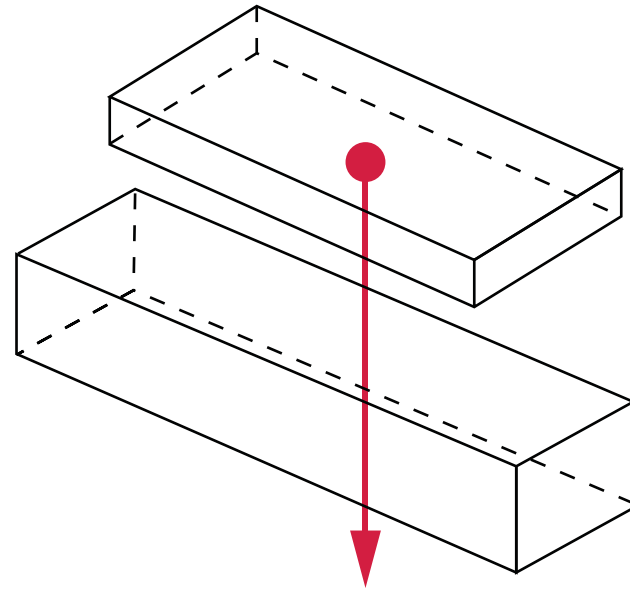
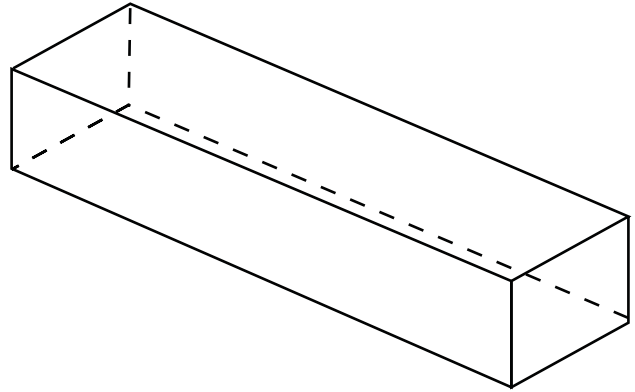
Waste treatment



Food production

The building in its surrounding as it will appear when finished.

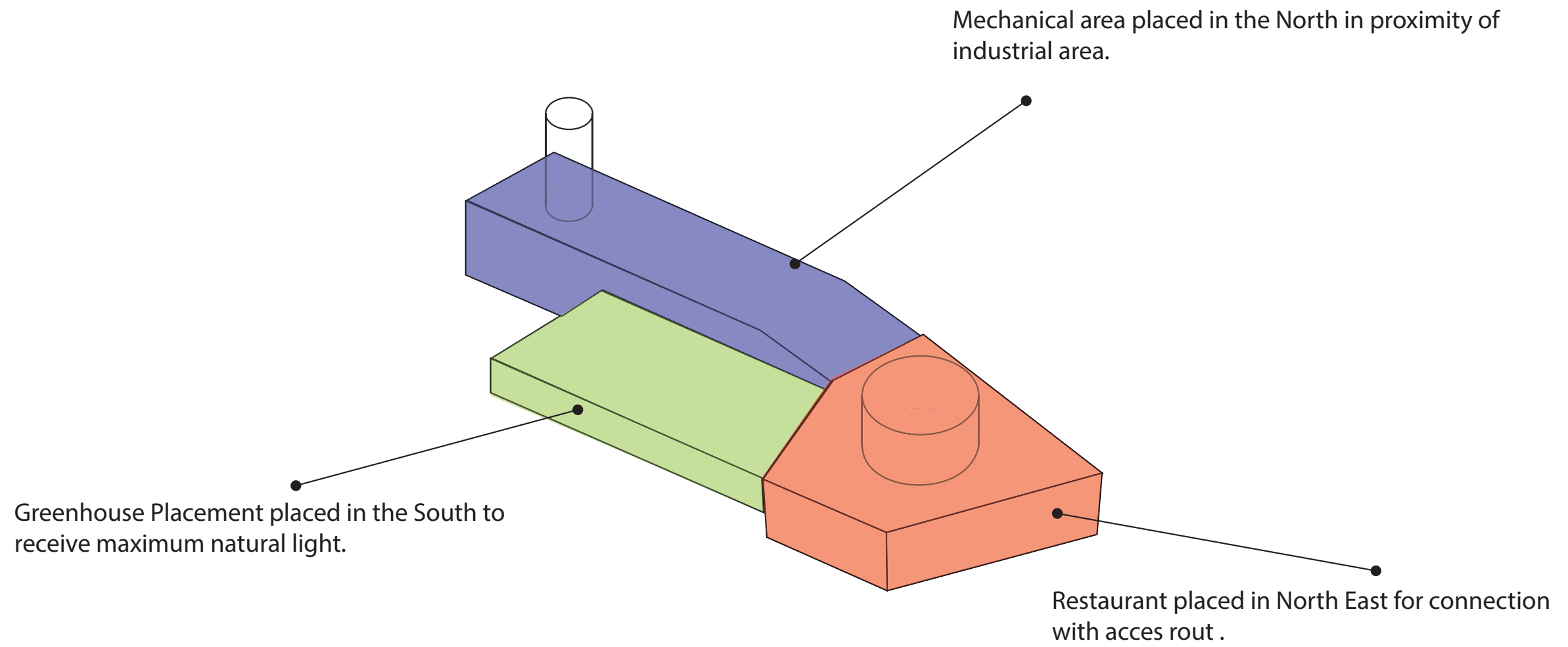


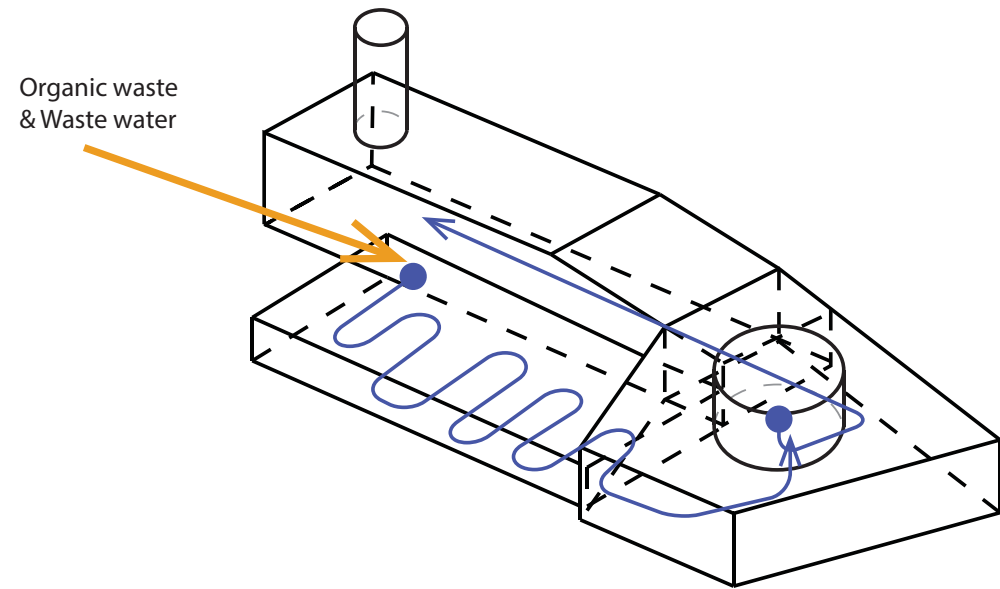


Waste treatment

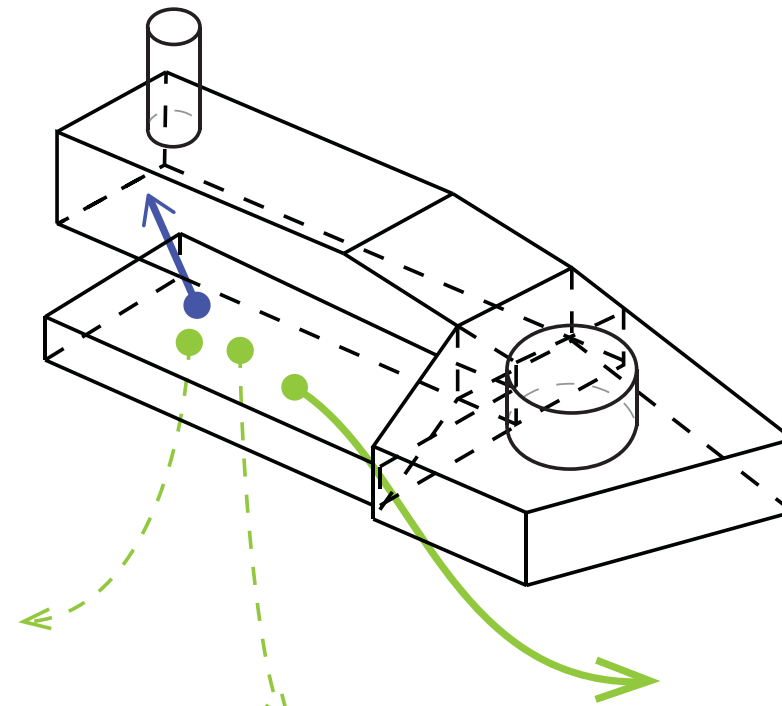
Food production

Kitchen & restaurant

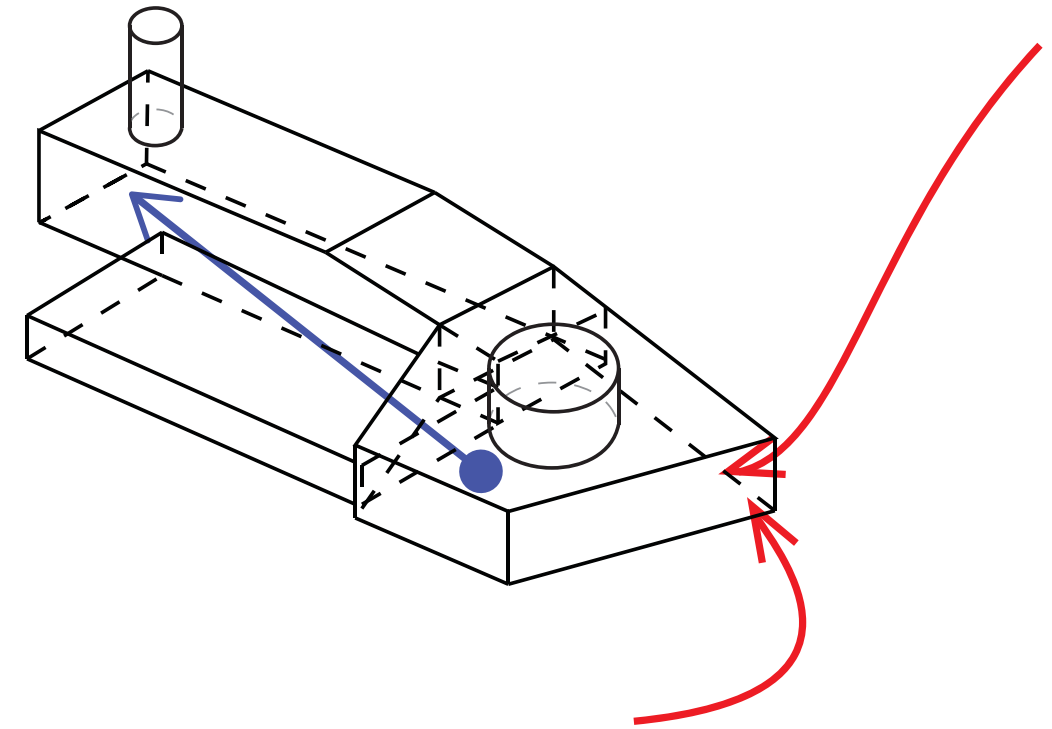




Waste coming in from outside building

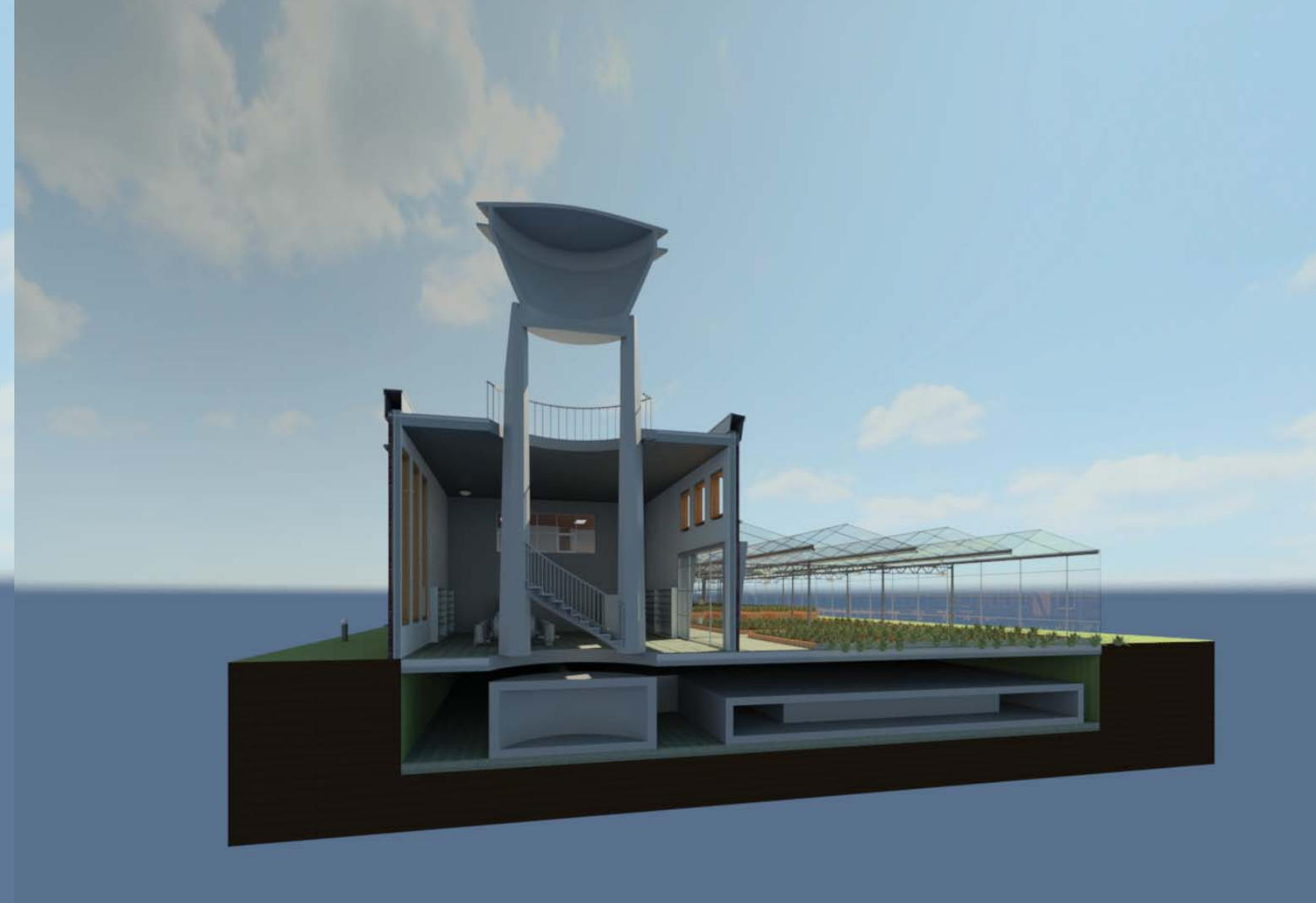


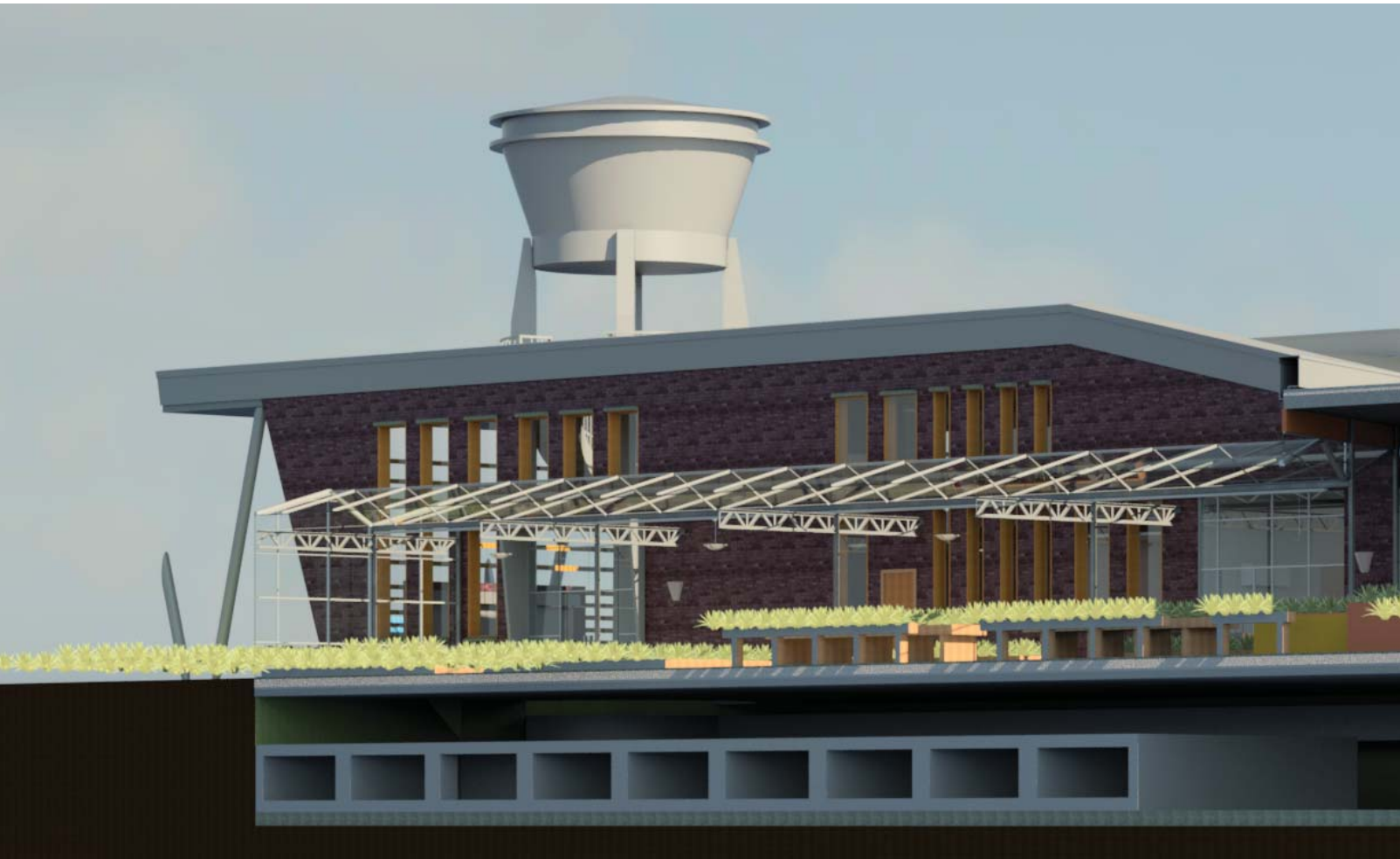
Waste from food production



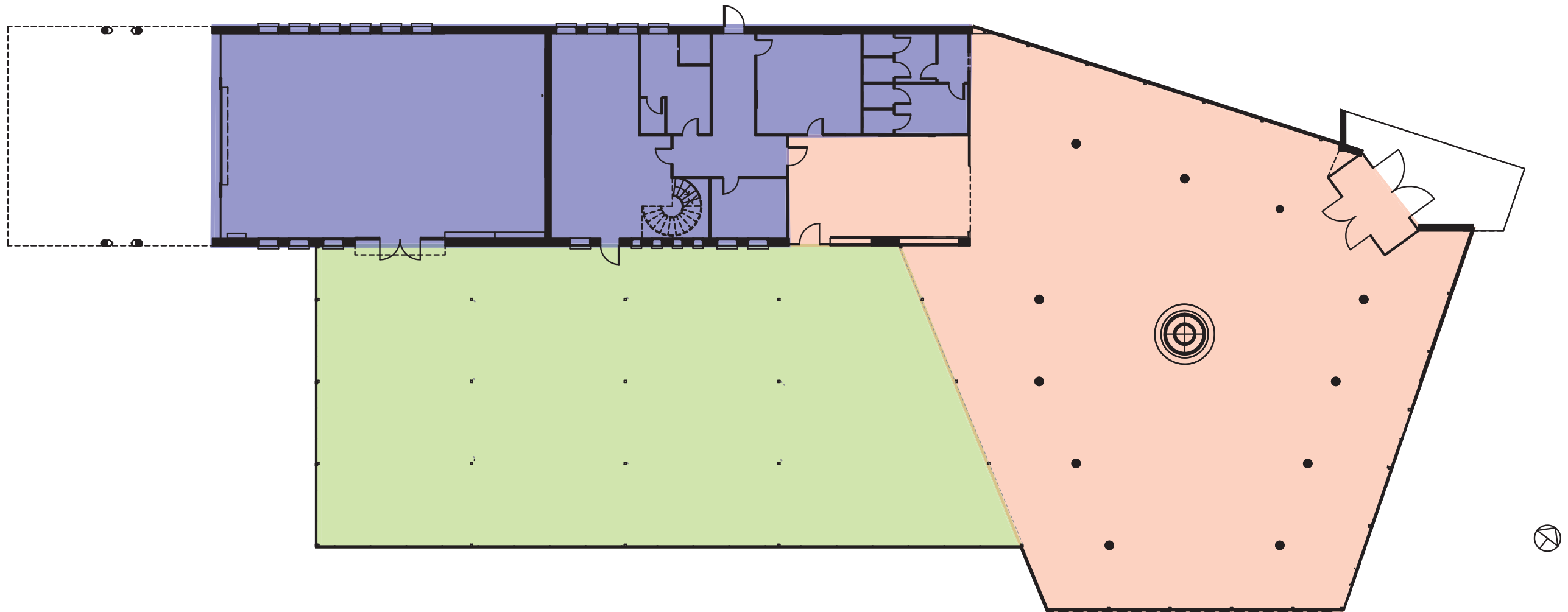
Waste from surrounding and visitors

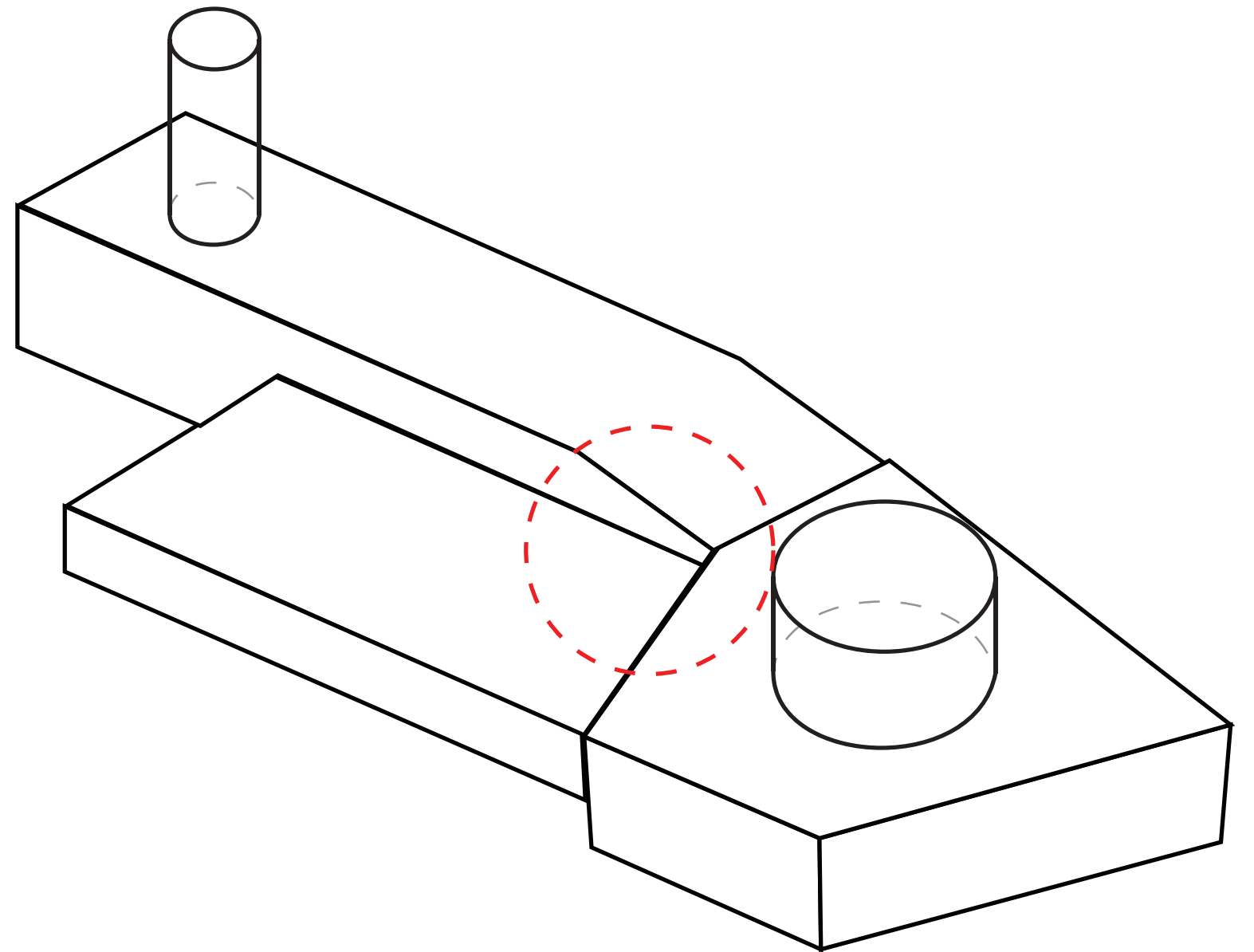
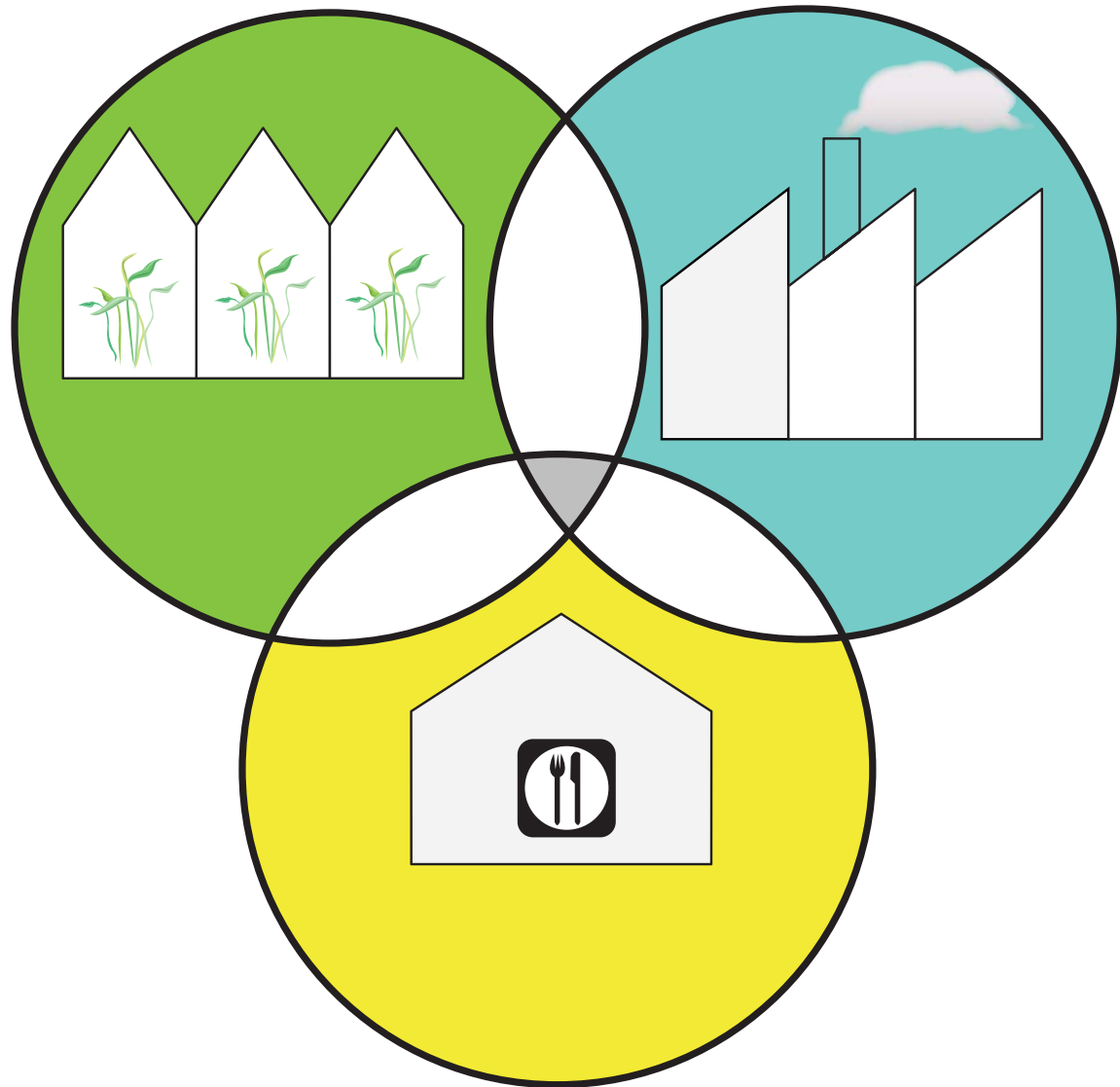
How the system work:

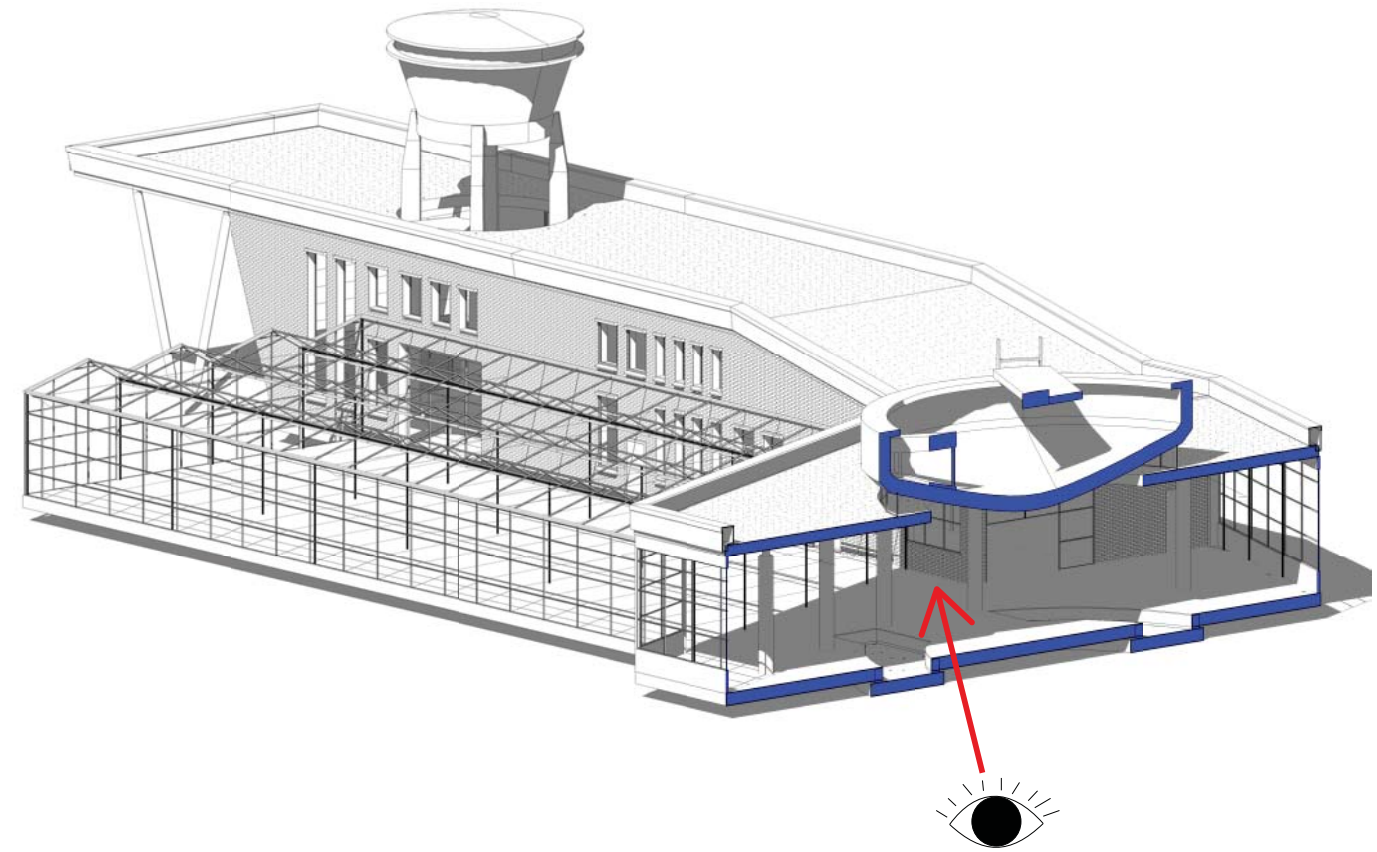
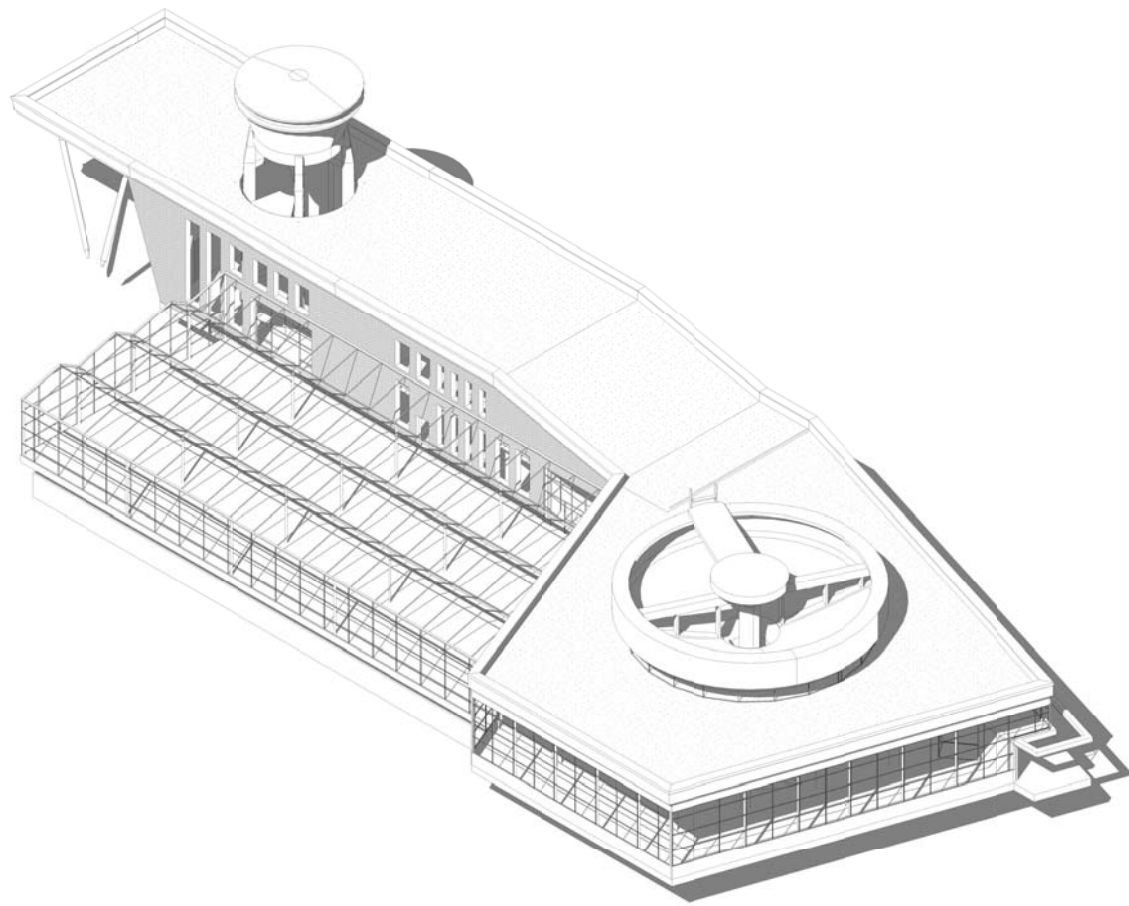




Waste treatment Food production Kitchen & restaurant

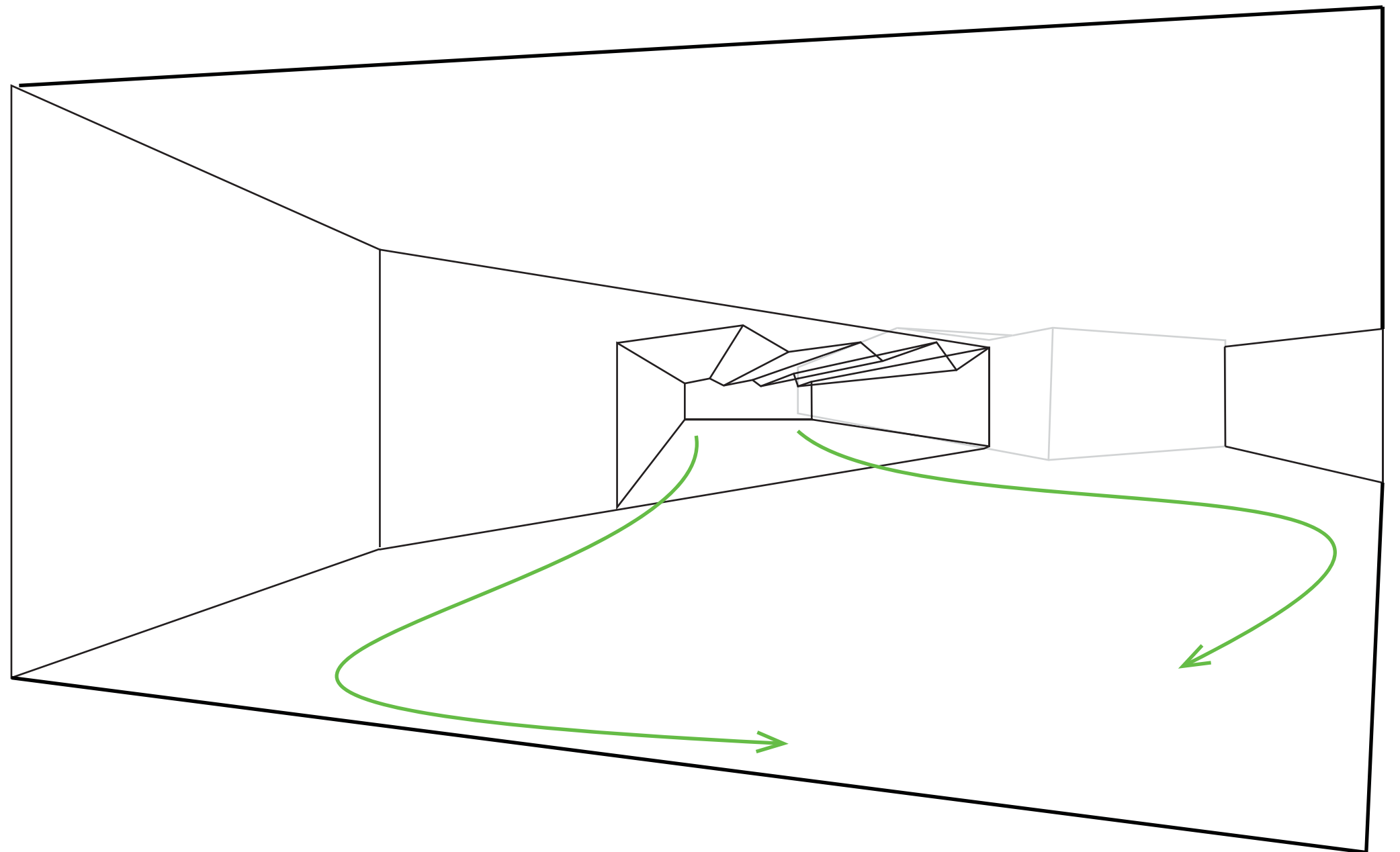
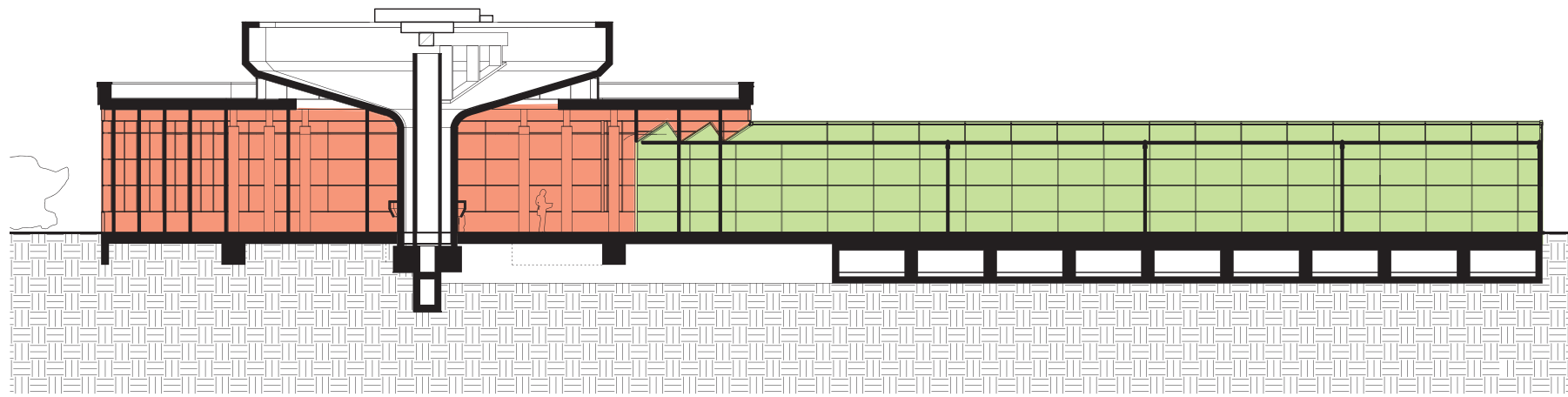






Food production

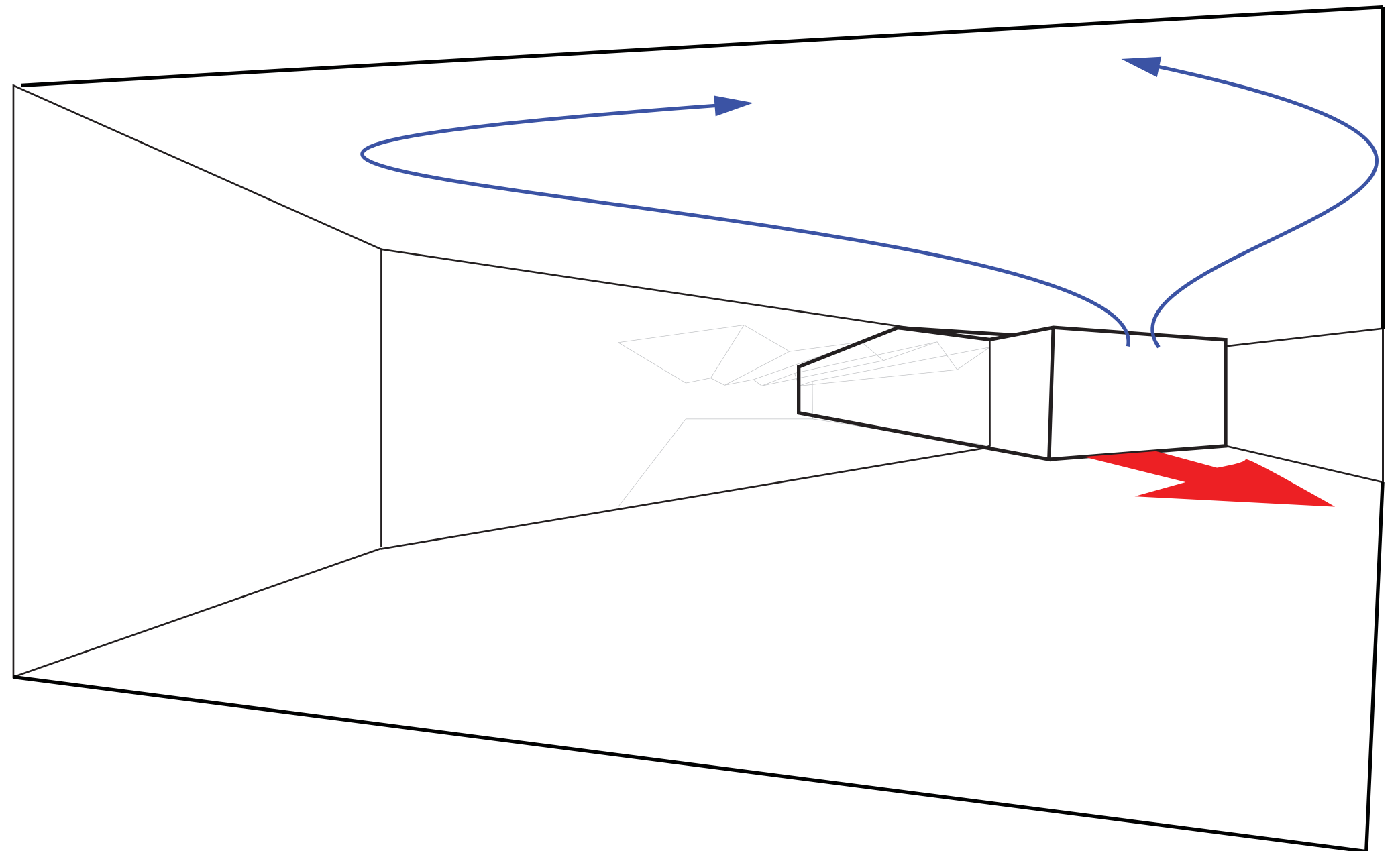
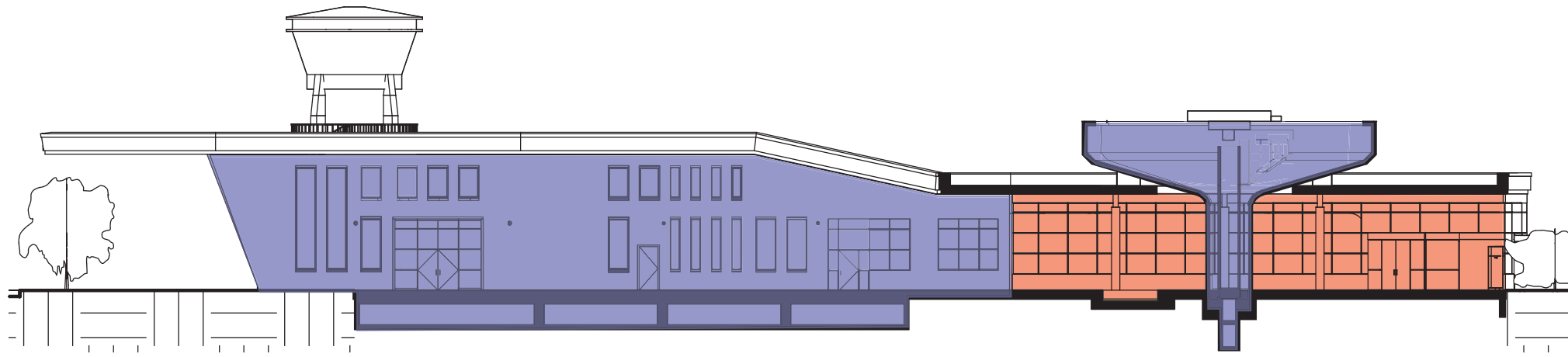
Kitchen & restaurant





Kitchen & restaurant

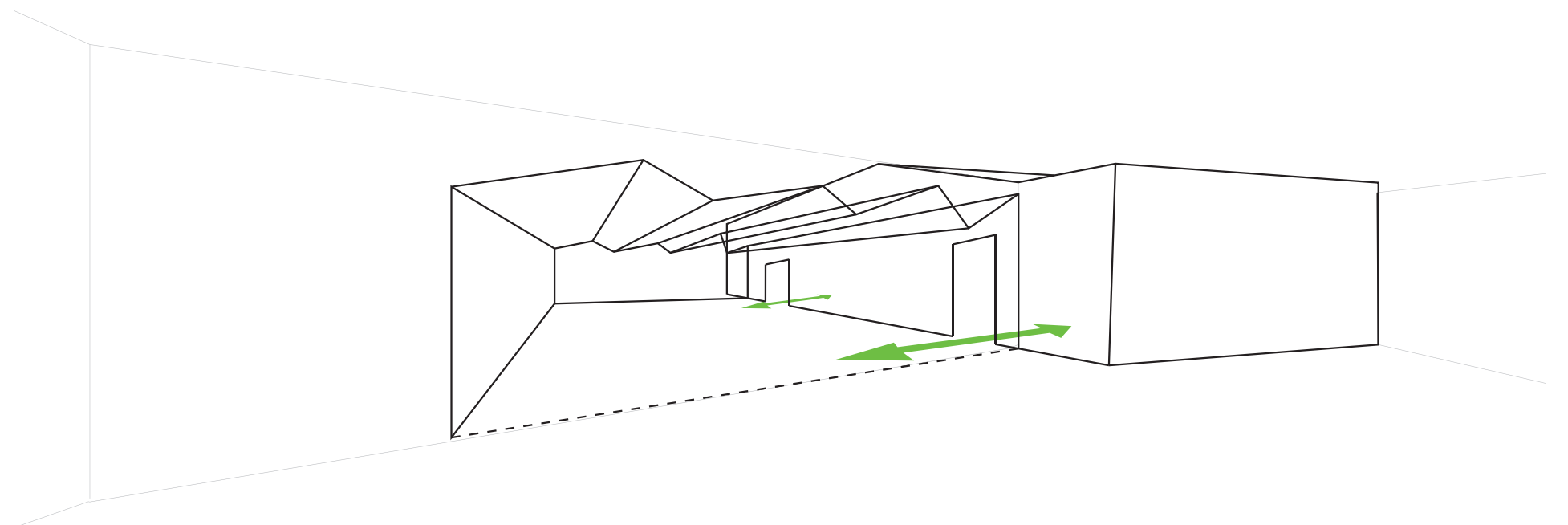
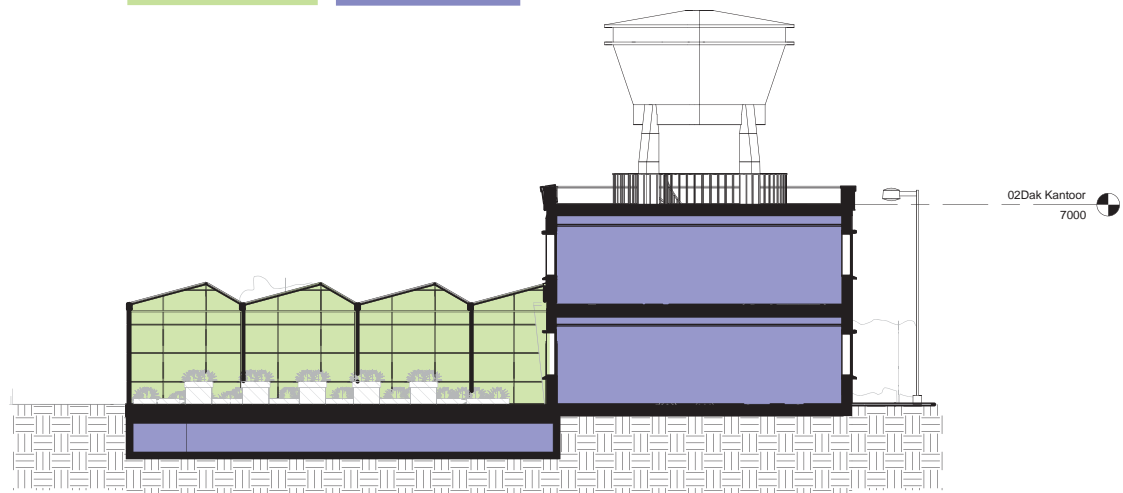
Waste treatment



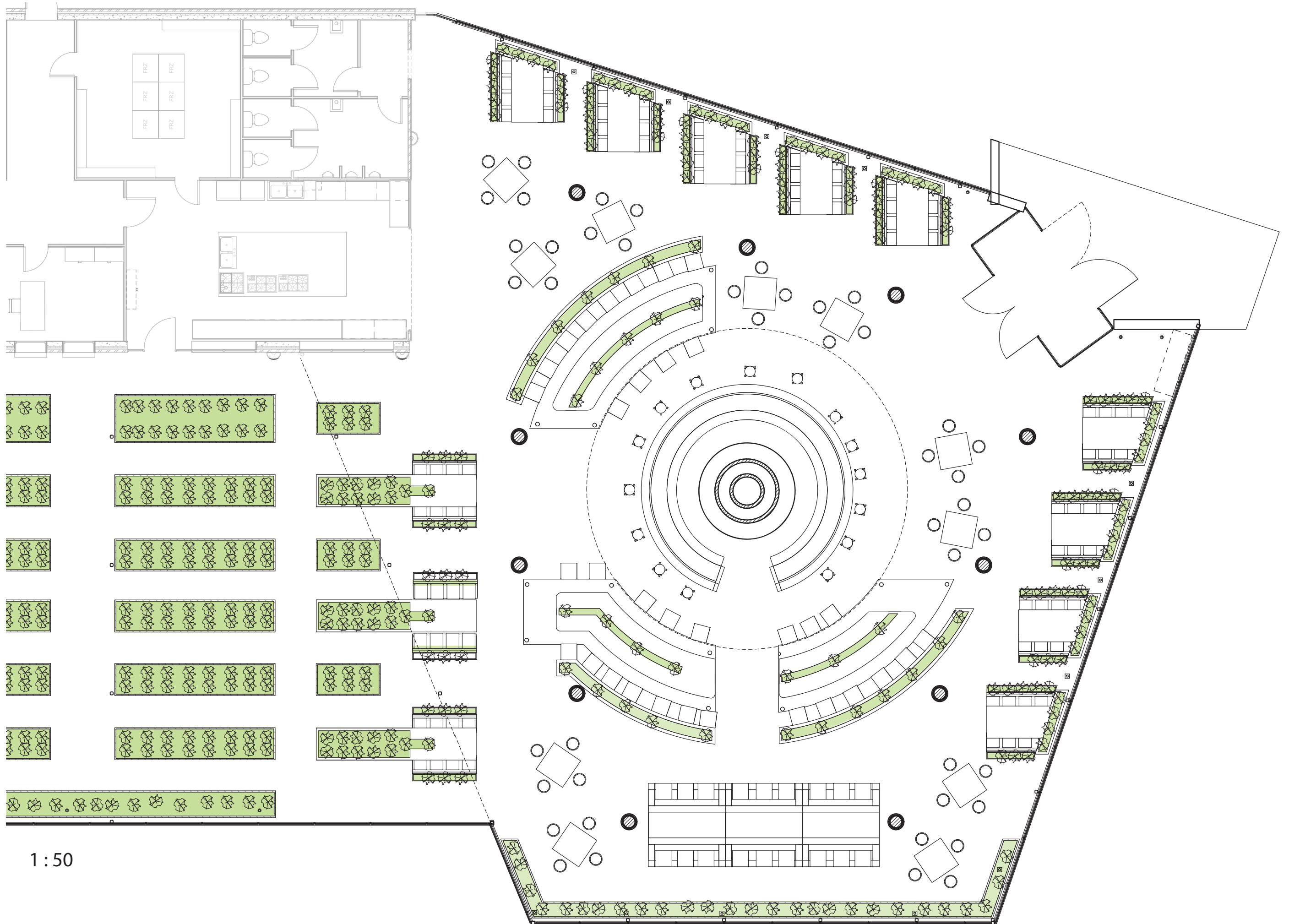


Food production

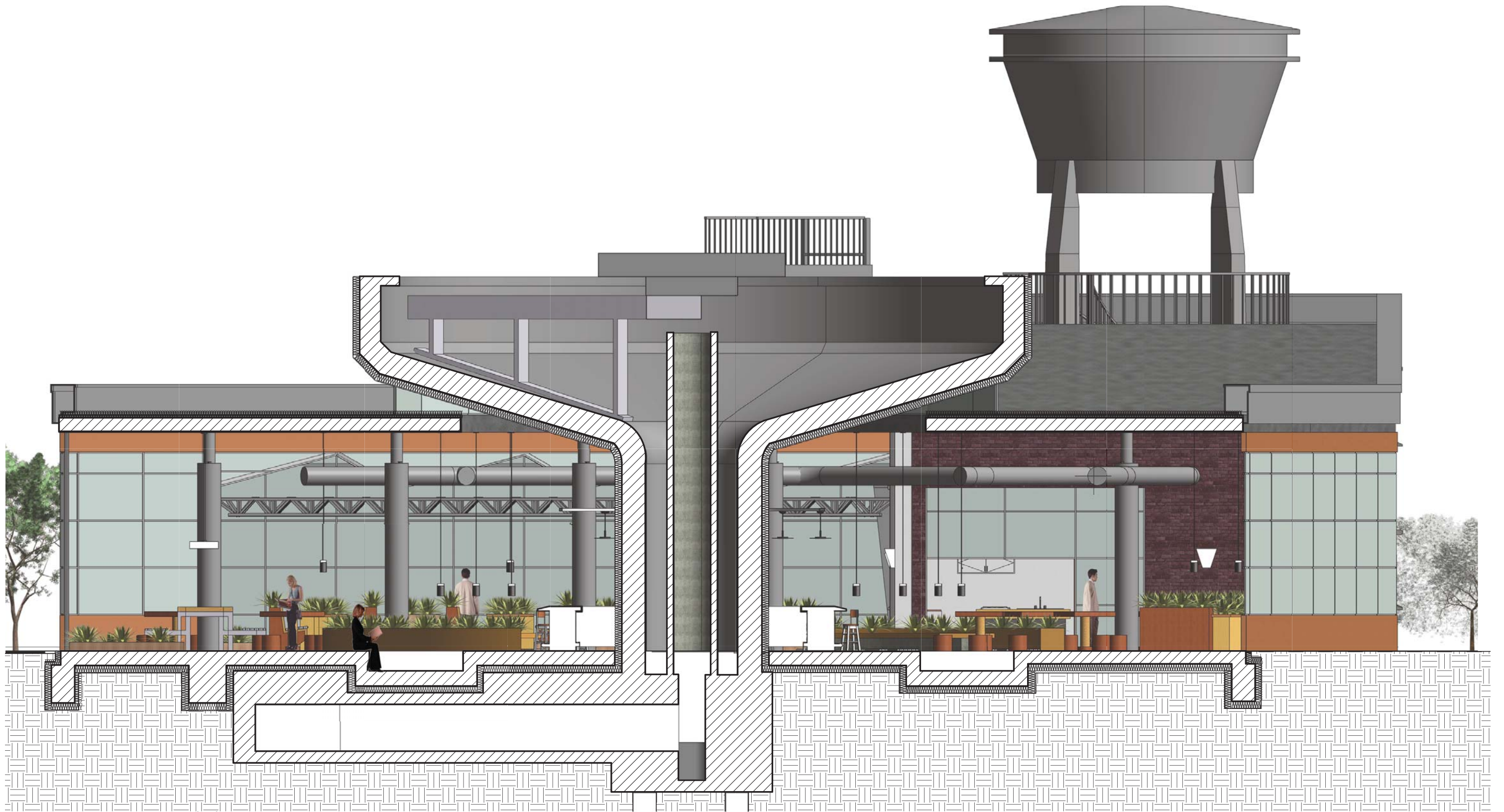
Waste treatment







1:50



1 : 50









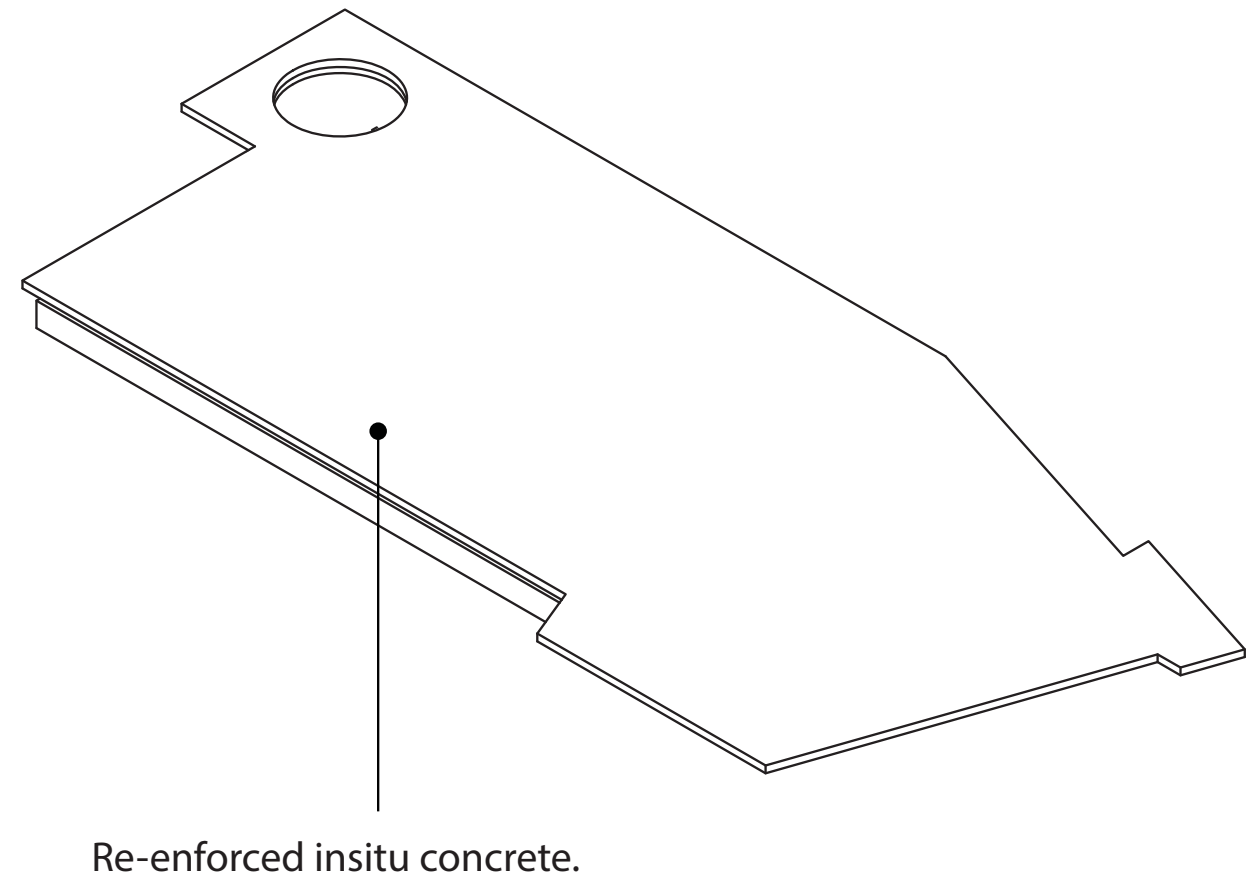
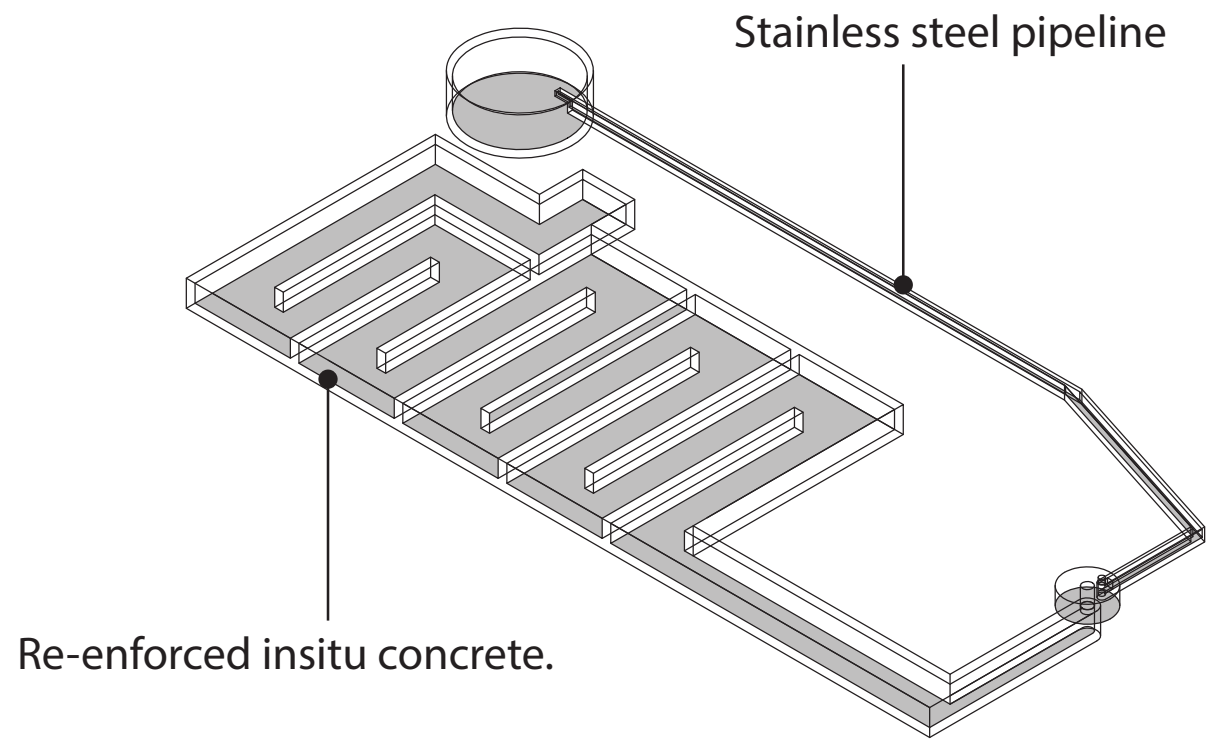


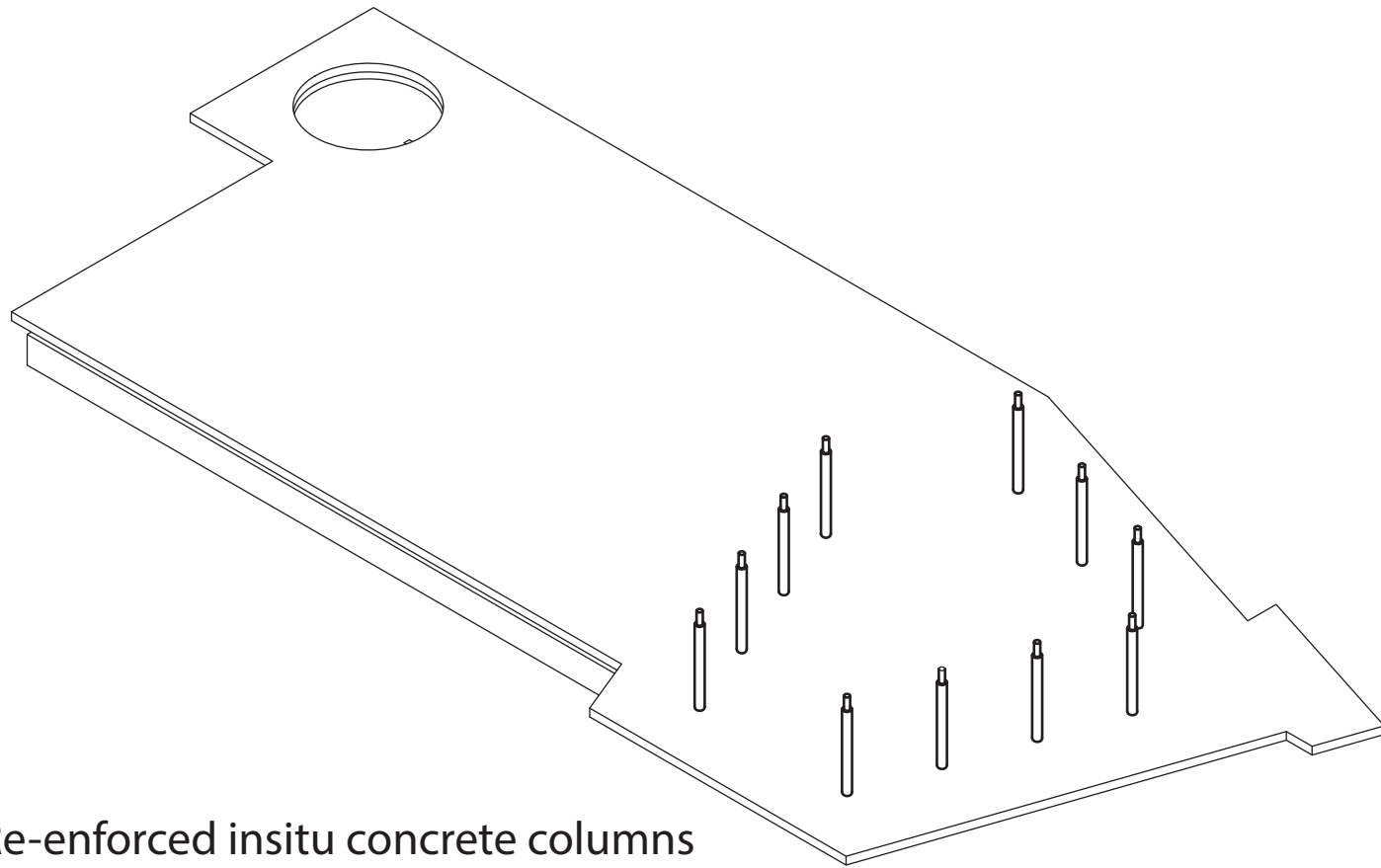




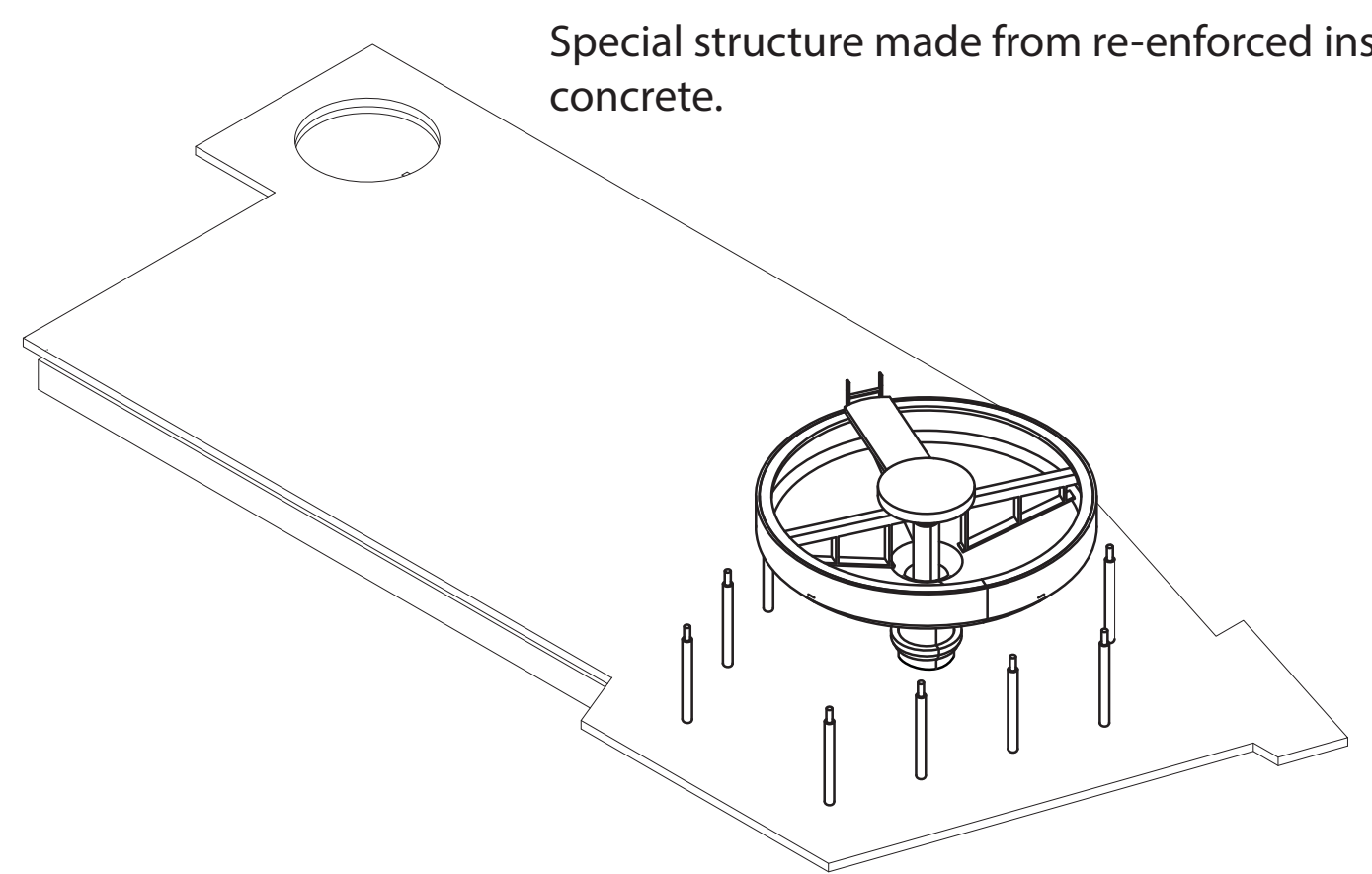


Technical aspects

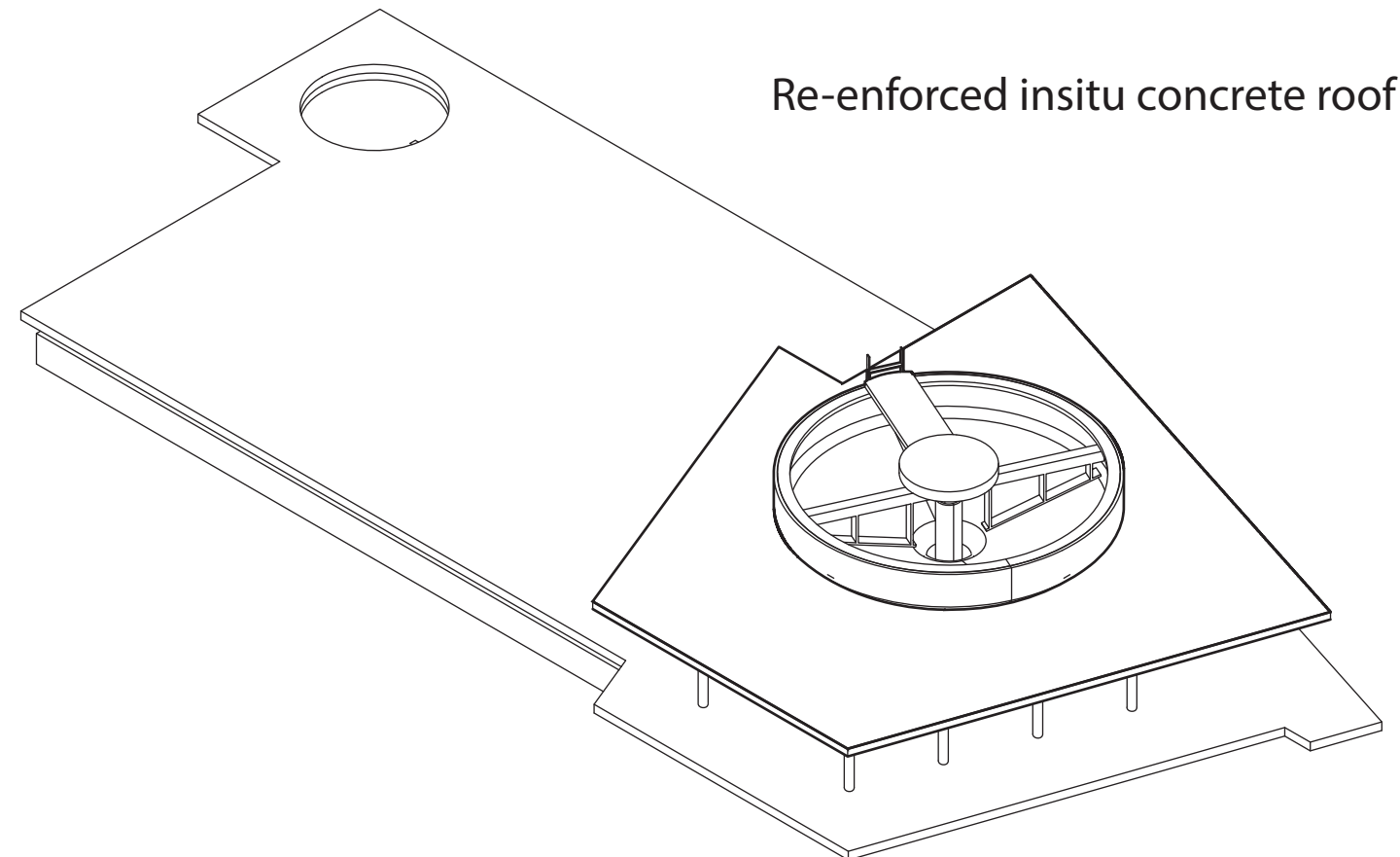




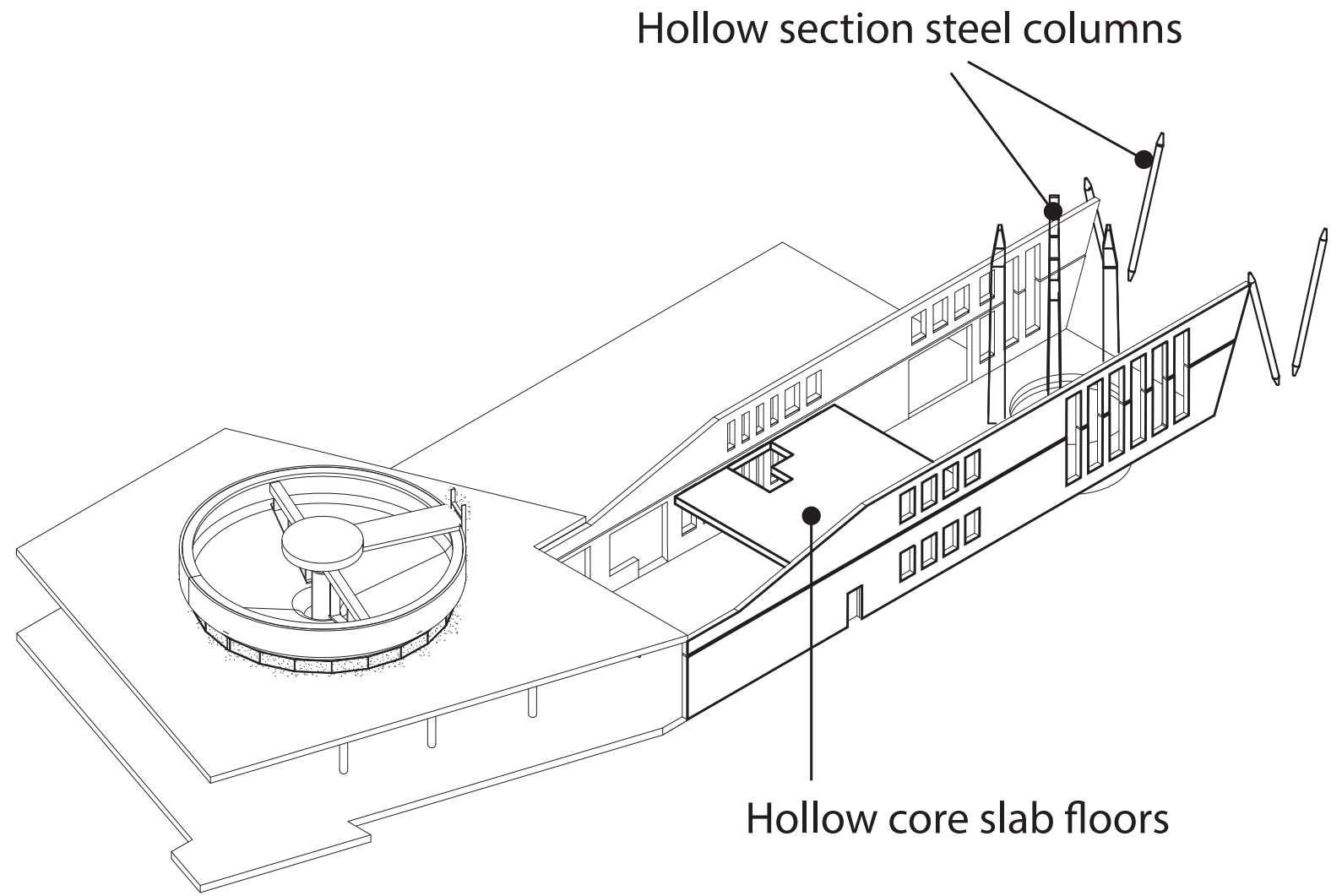
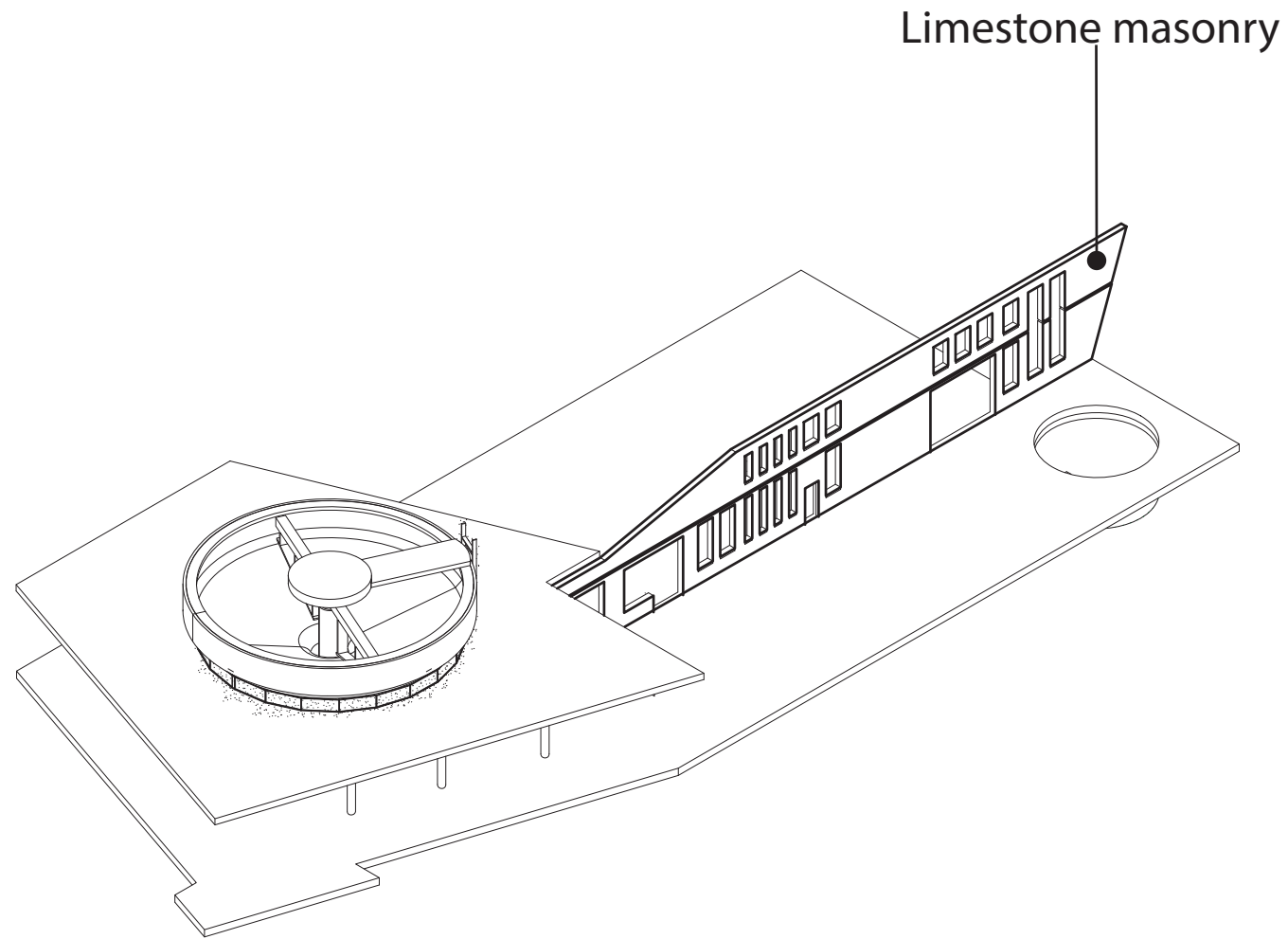
Re-enforced insitu concrete columns

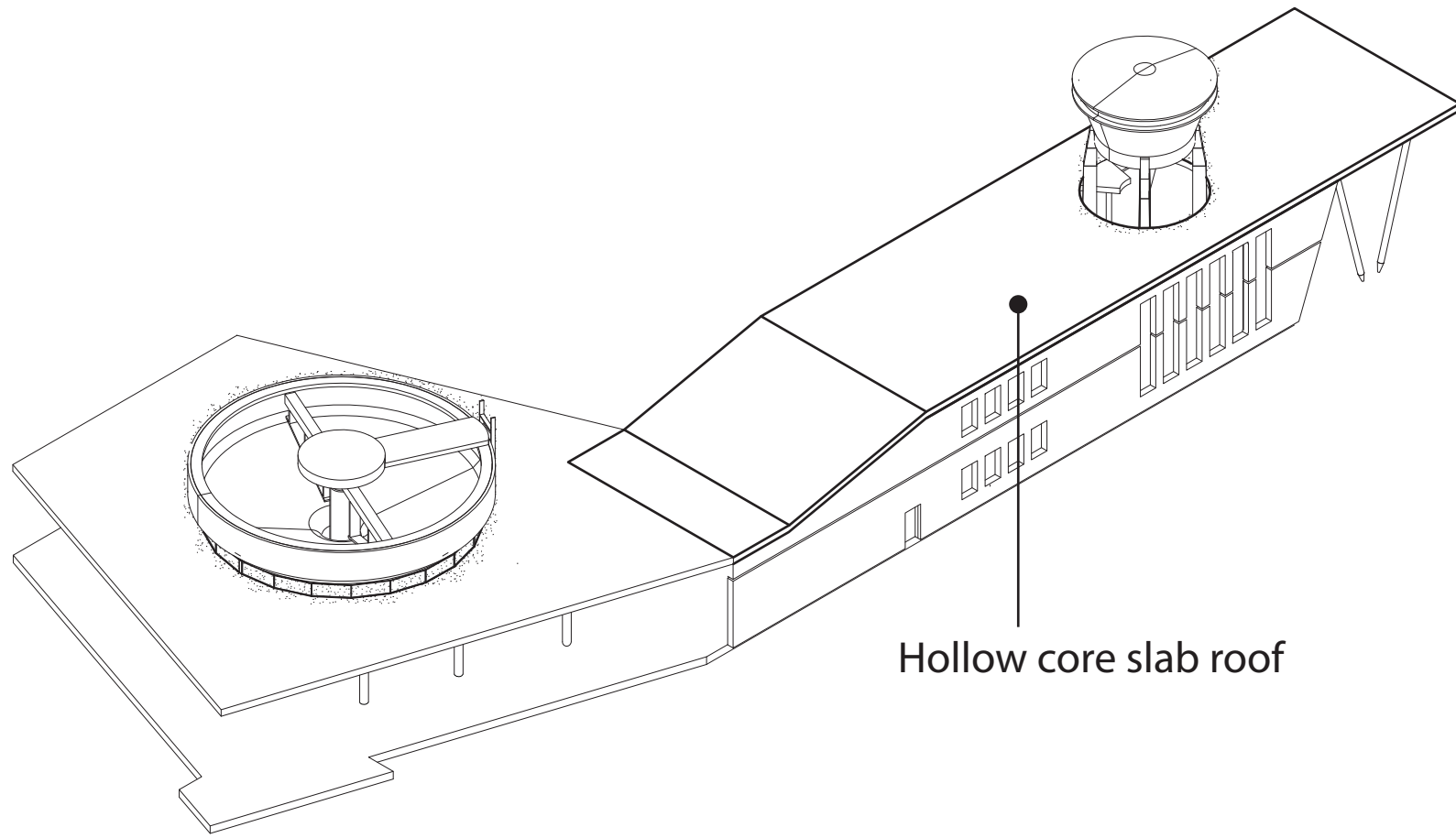


Special structure made from re-enforced insitu concrete.

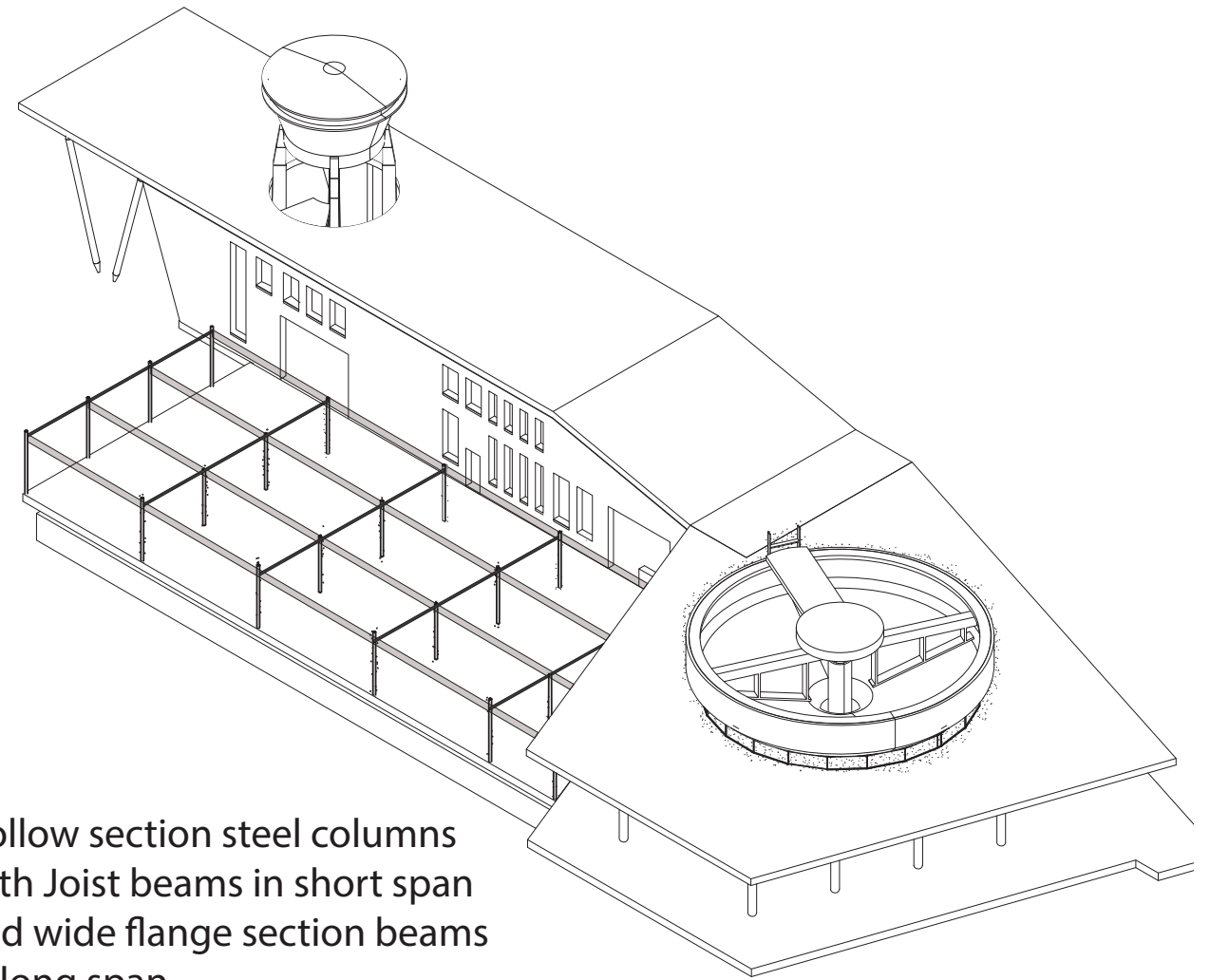


Re-enforced insitu concrete roof



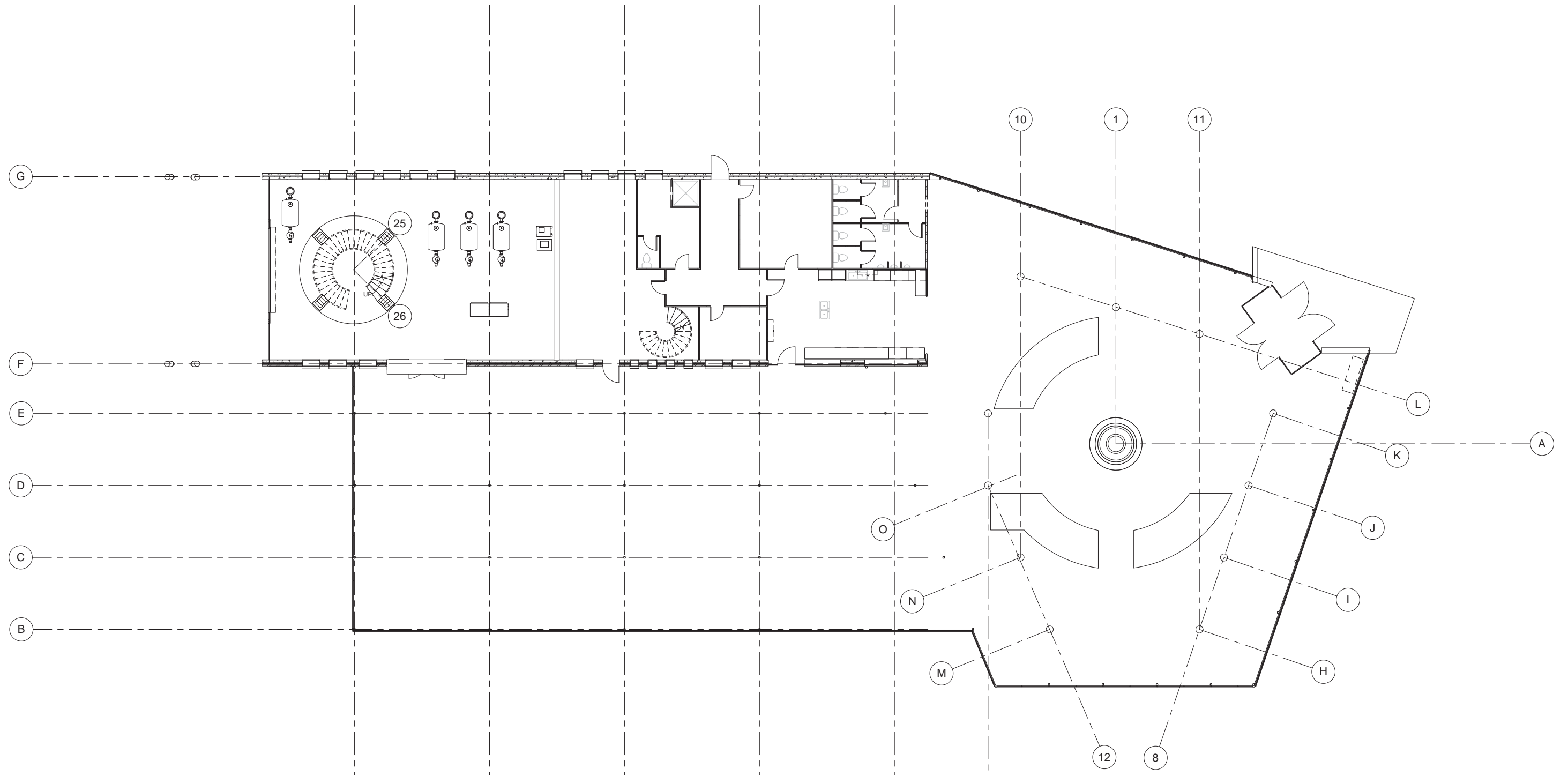


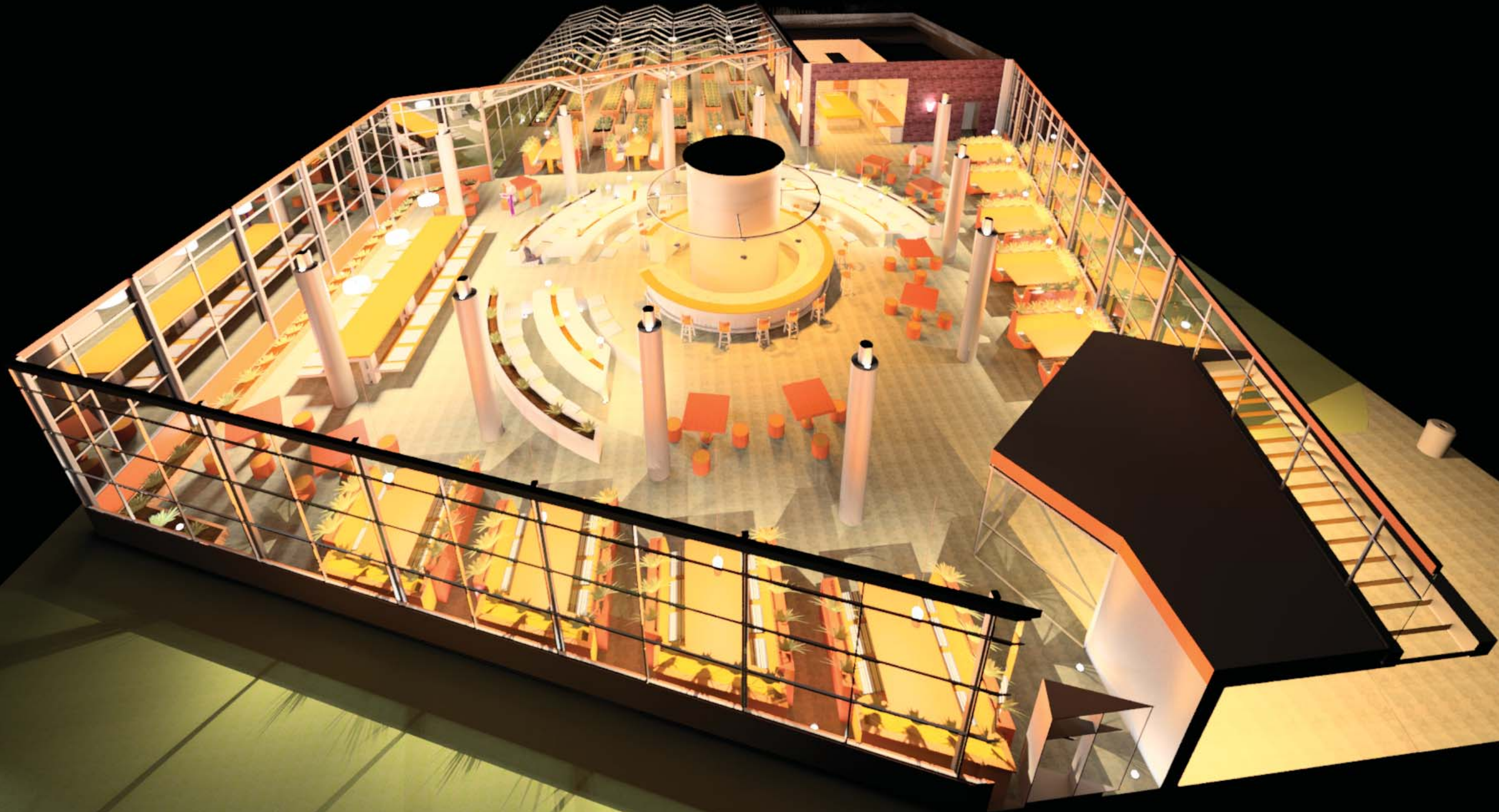
Hollow core slab roof



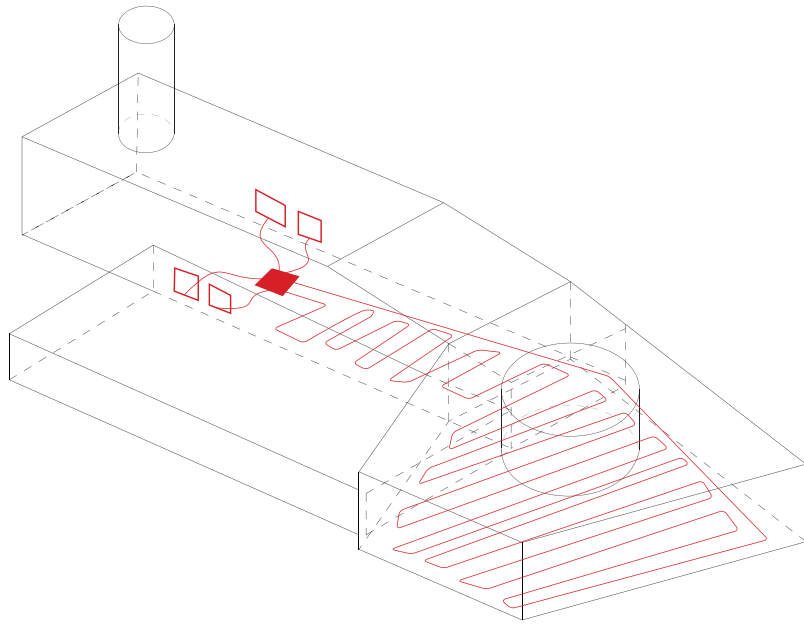
Hollow section steel columns with Joist beams in short span and wide flange section beams in long span



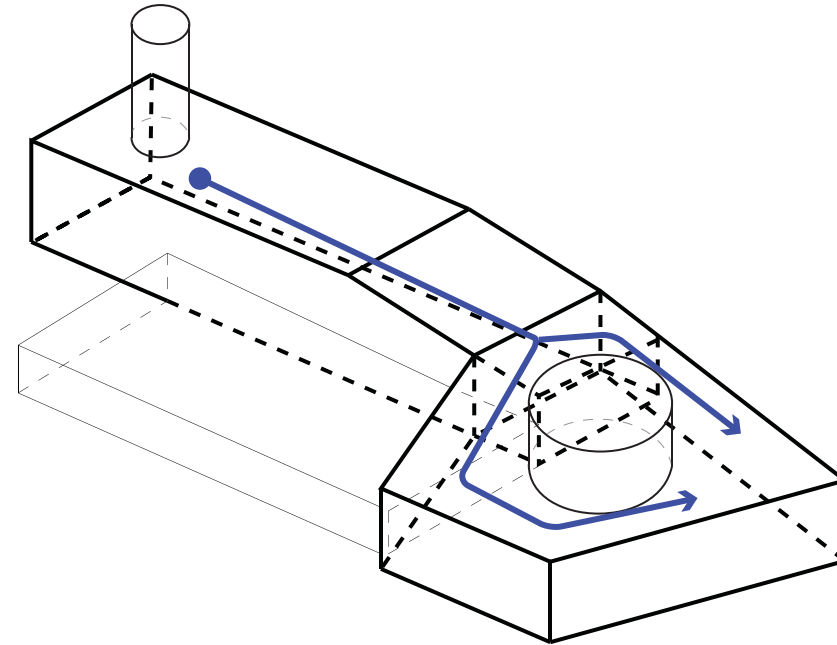




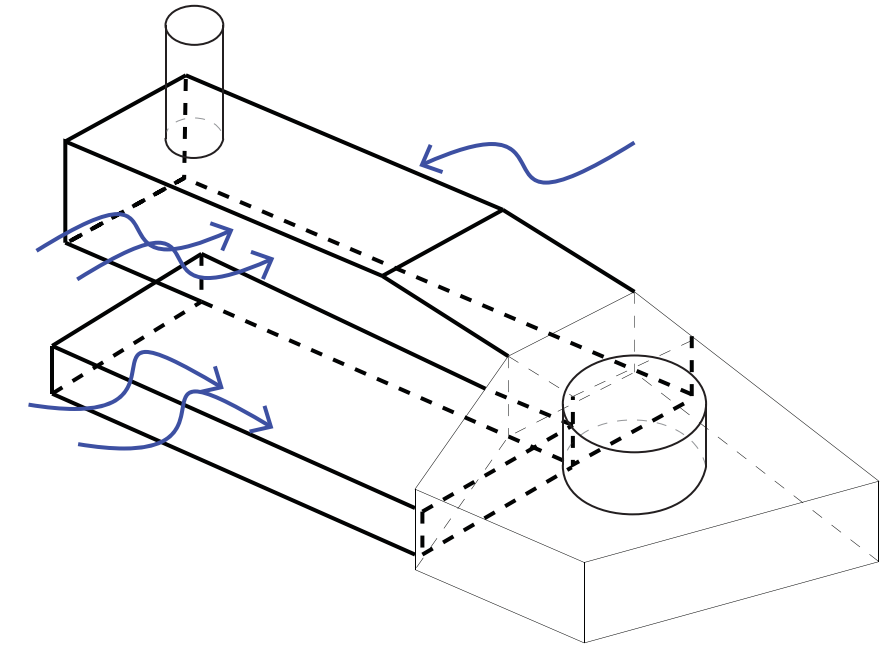




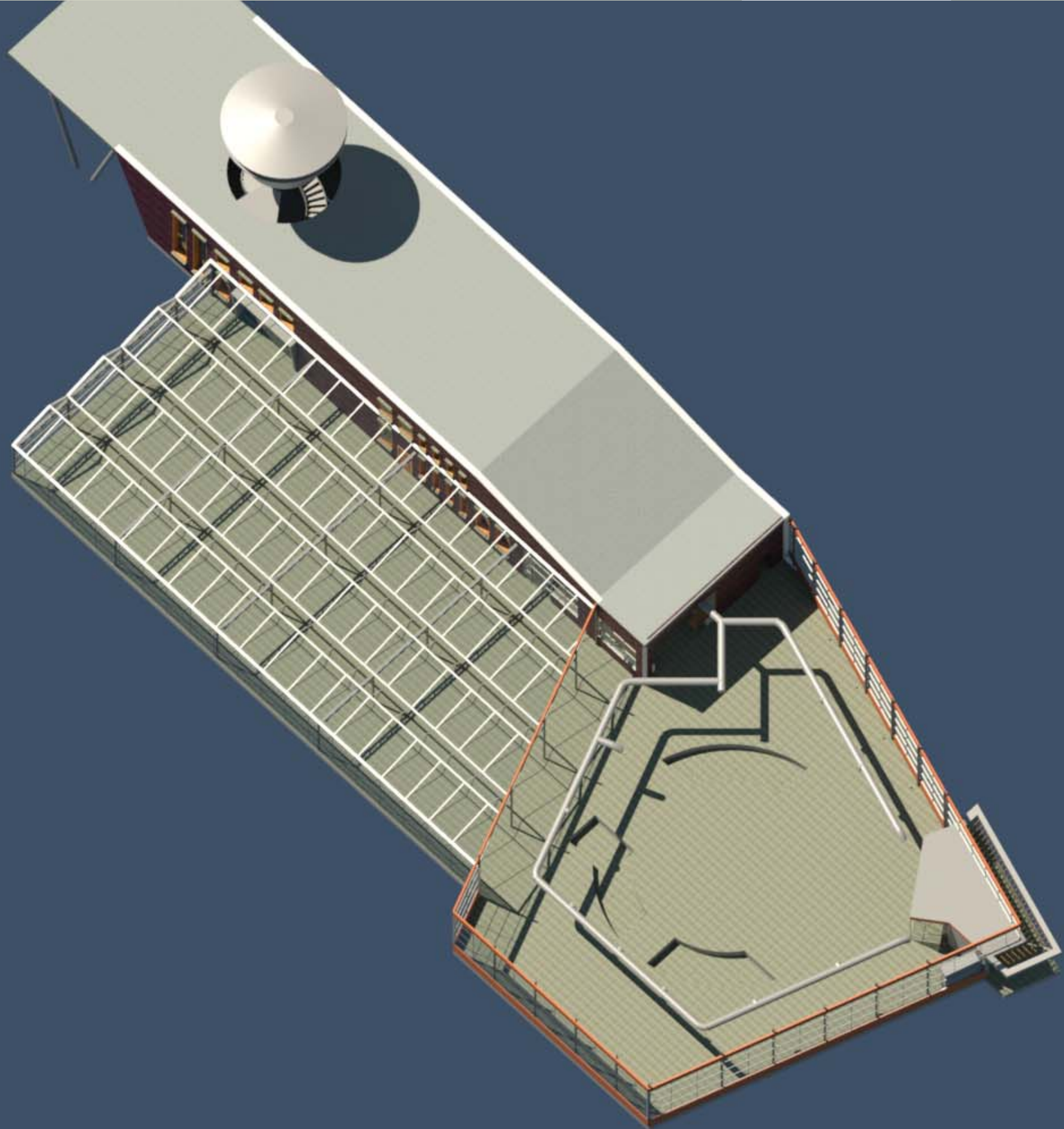
Floor heating in restaurant and waste treatment offices. Offices also use radiator panels on walls.



Fully mechanical ventilation system in restaurant that also serve als heating. Offices have natural intake and mechanical exhaust.



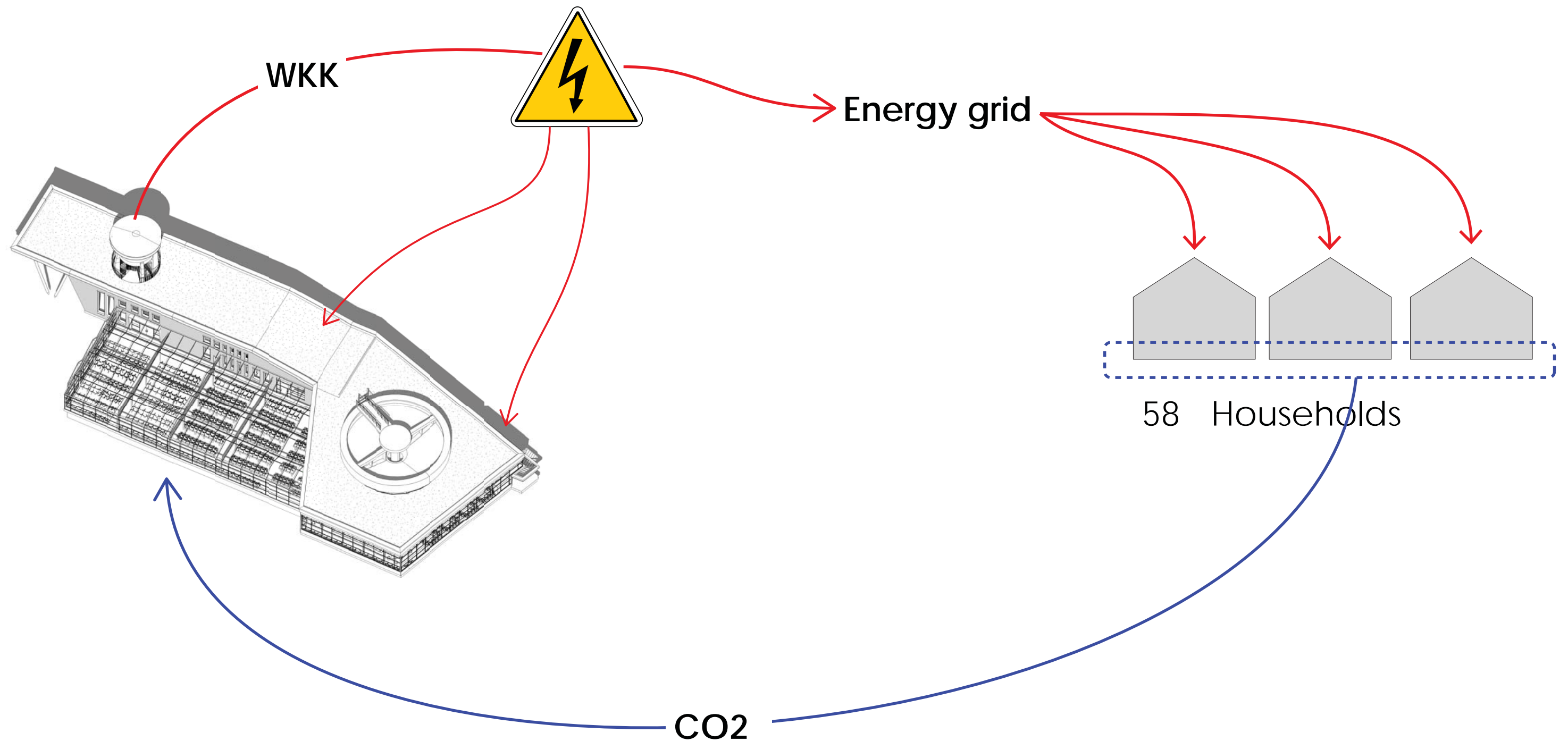
Greenhouse have operable panels on the roof for natural intake.





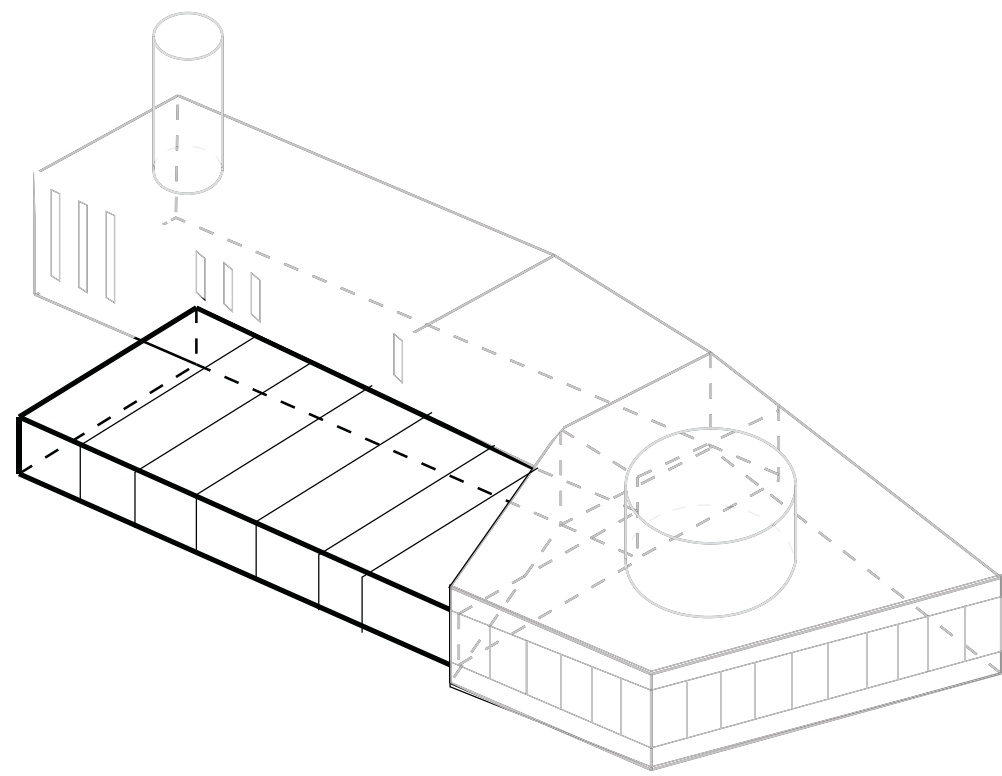
1 person generates 2.5m³ sludge
 resulting in **423MJoule** energy
 12476 inhabitants can create ap-
 promiximately **5300GJoule** energy.

Design requires:
430GJoule for heating and cooking 140000kWh
 or **500GJoule** for electricity

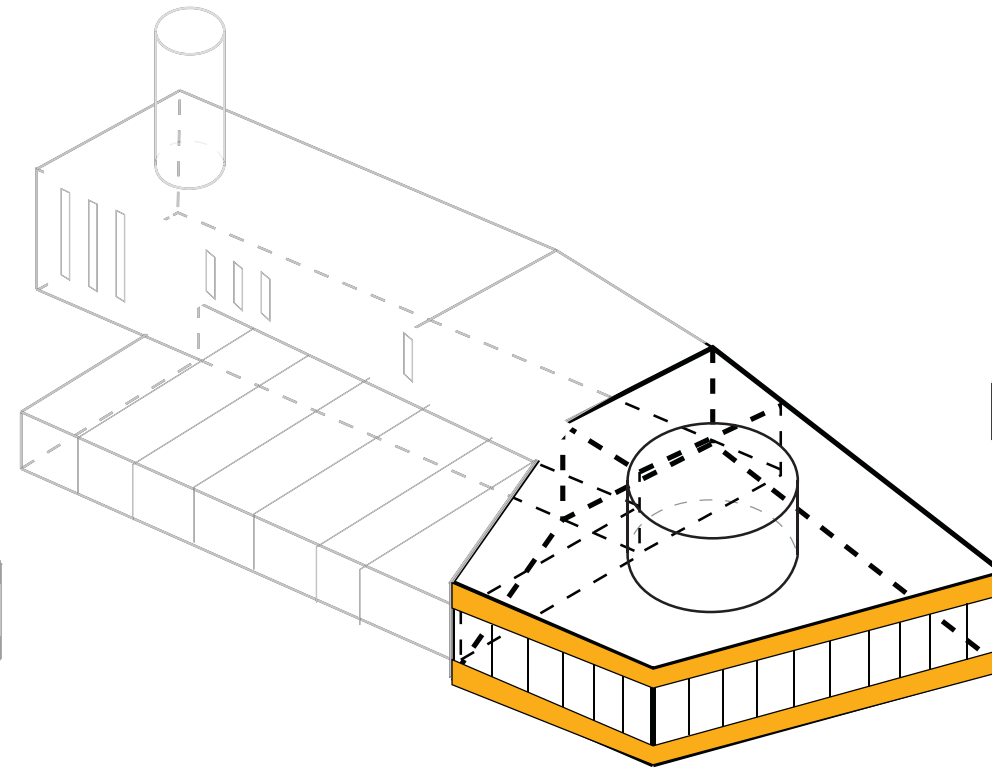


Note: Utility buildings from 500m²-10000m² require 455MJoule/m²
 for heating and 305MJoule/m² for electricity

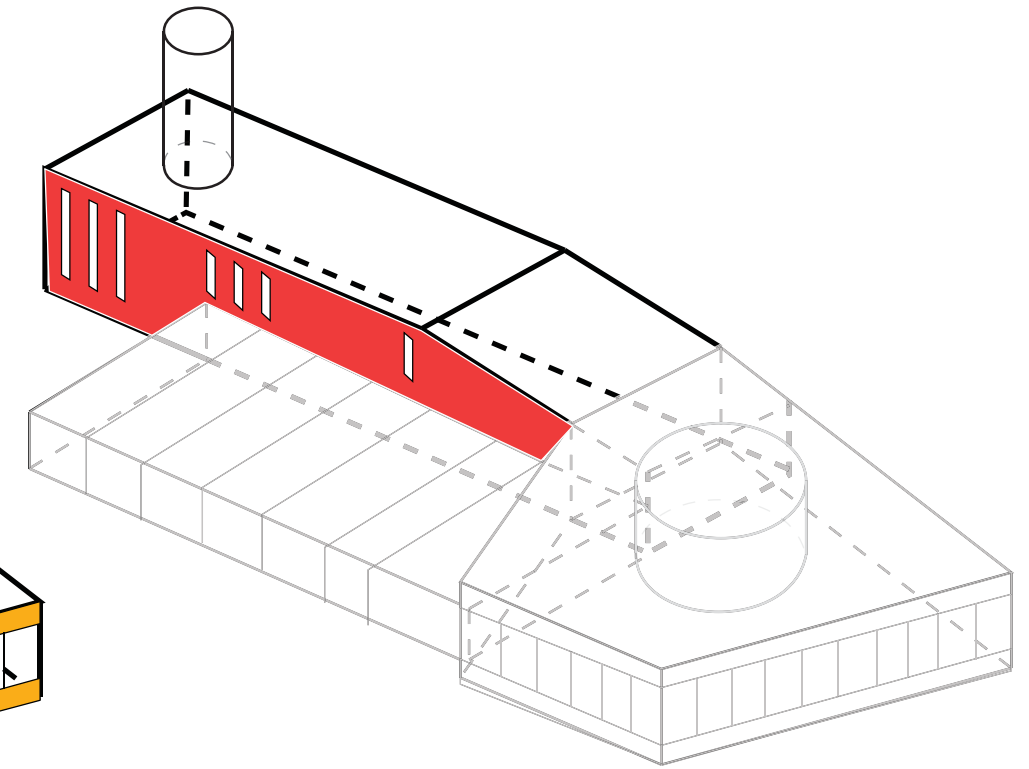
Note: 1 household uses 5000kWh electricity
 56 GJoule gas



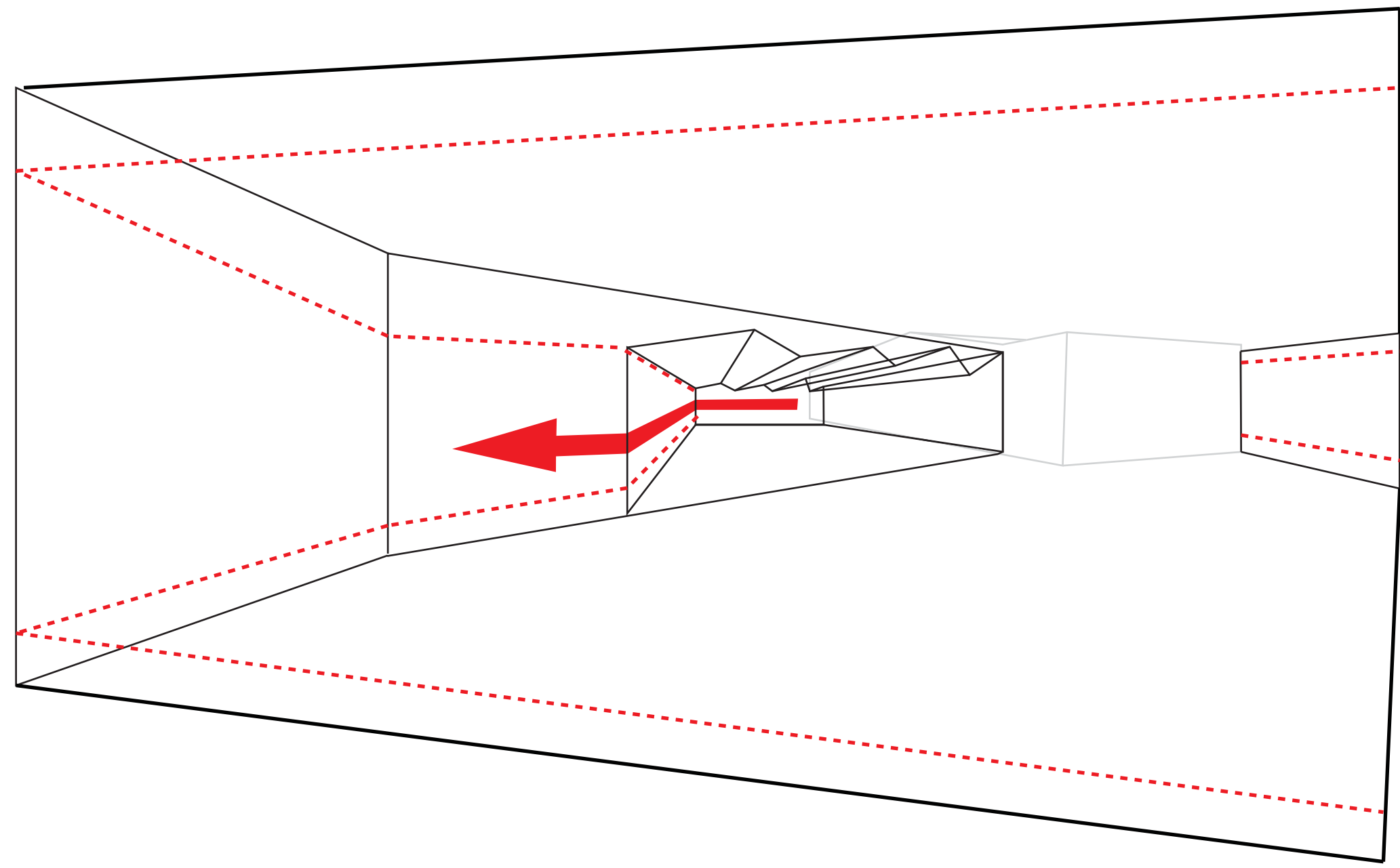
Greenhouse: transparency

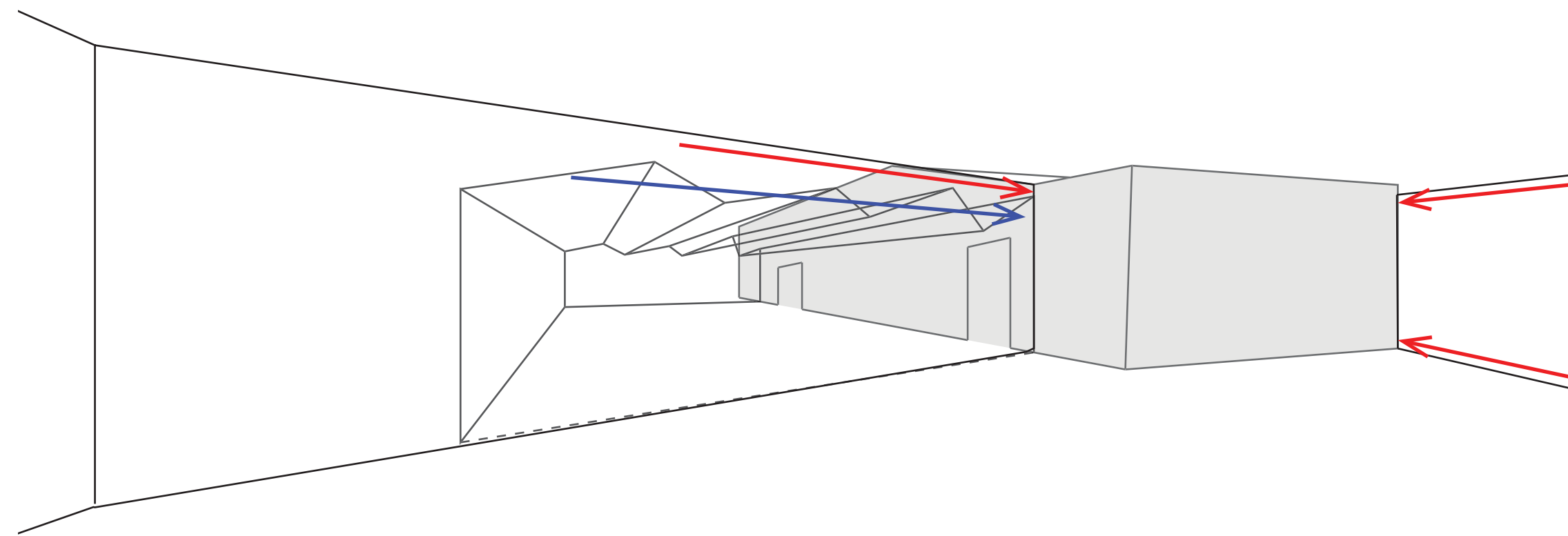


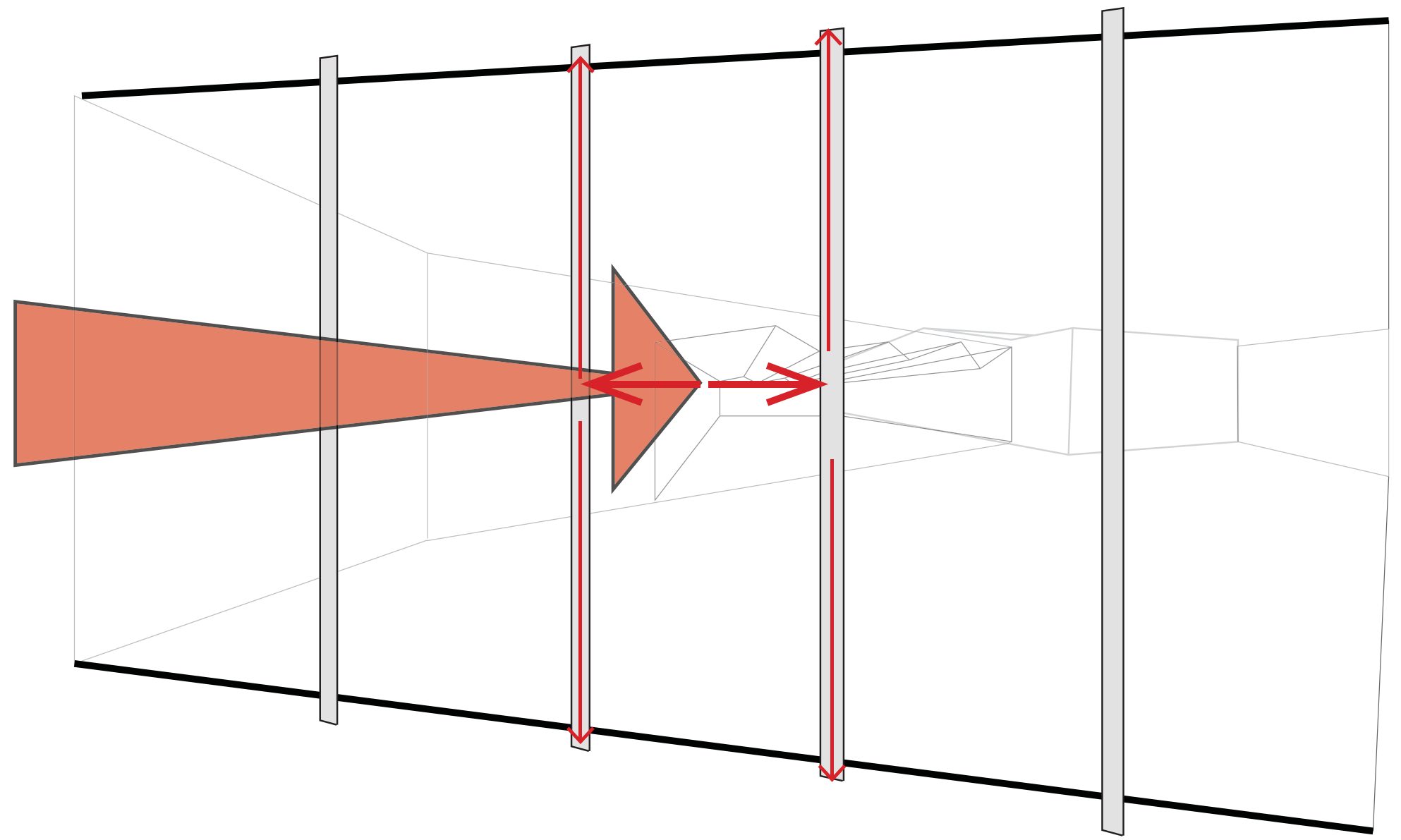
Restaurant: transparency in the middle stroke

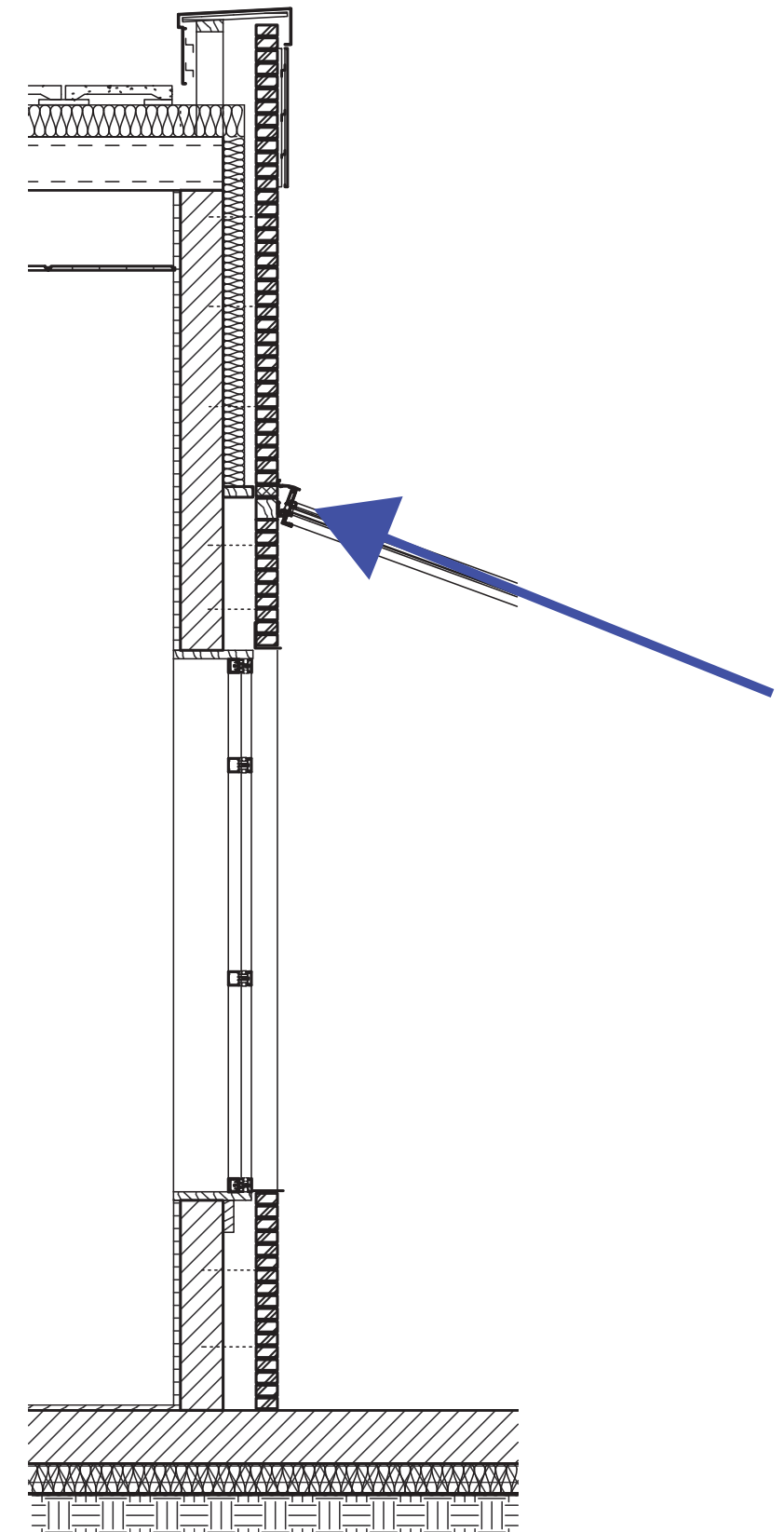
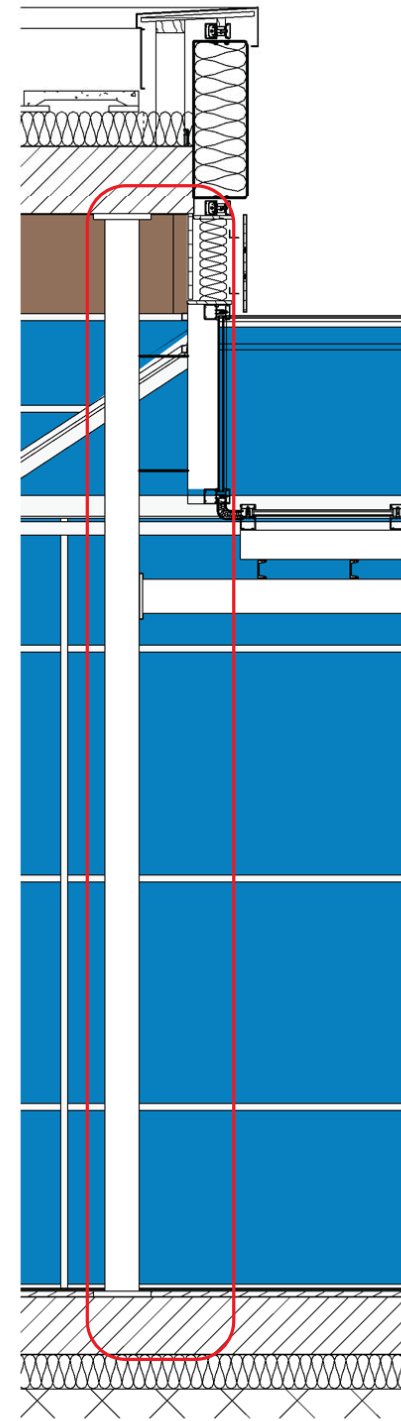
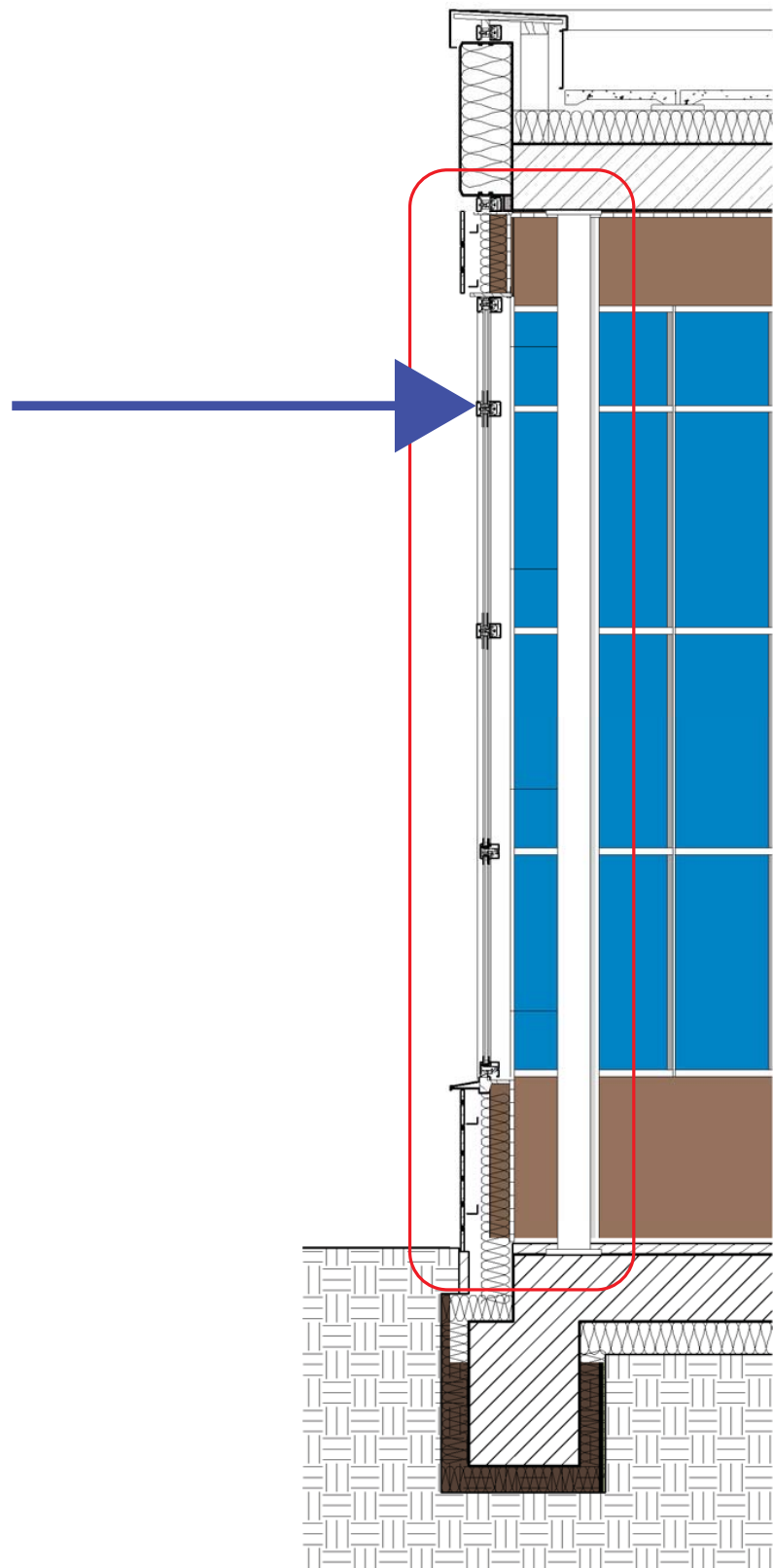


Waste treatment: massive volume with thin vertical openings









1 : 20











