

MASTERPLAN

KEFI LAVIK INTERNATIONAL AIRPORT

ID: 89046



KEFLAVIK MASTERPLAN

The proposed masterplan seeks to form a robust and flexible framework that will ensure a long lasting and meaningful future development of the airport until 2040.

Based on our analysis and the competition material, we suggest a development that optimizes the use of the existing facilities, runways, building mass and traffic flow while avoiding potential disturbances during construction. In this way it is ensured that the project is in accordance with the goals of Iceland.

The airport's role as a hub between two continents is unique and sets standards regarding traffic, peak demands and future needs changes to be adhered to by a scheme that is open for alternative developments and flexible for unforeseen needs.

LAND USE DEVELOPMENT

Terminal area

The suitability of the existing Terminal area has been analyzed with regard to location, access, potential impact on the environment, cost and operations during construction work. It has been found to be very suitable for future development. It has been deemed unnecessary to study the implications of an entirely new Terminal location.

Access roads

The Reykjavíkbraut is maintained as the main access road for the airport. Furthermore, it is proposed to establish a supplementary access route branching off earlier, for instance at Ásturbær, for service vehicles, goods and waste transports. This route will be subject to the same design and construction standard as the main access route.

This route may also be used as an alternative route for accessing the Terminal, in case of incidents at the main access.

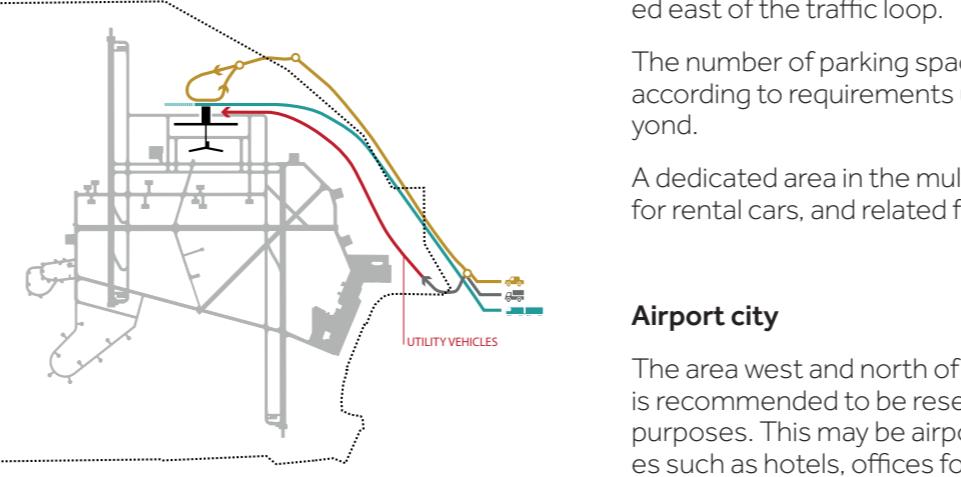


DIAGRAM 1: The main traffic infrastructure to the competition area.

Rail connection

A reservation for the rail line to the airport is proposed at the south-west side of Reykjavíkbraut. The line will go into a cut towards the north side of the extended Terminal. The rail station is proposed to be located near the traffic forecast between the Terminal and the traffic forecast. Passengers are bridged over the station. The line is planned to be double tracked within the airport.

In the event of the Terminal and rail are constructed at different stages, adequate measures should be taken to secure the construction of the airport until 2040.

Traffic forecast

The traffic forecast is recommended constructed with two levels, with the upper level on a bridge construction. The upper level will be for departing passengers, while the lower level will be for arriving passengers. The traffic forecast results in 10 MPPA in a foreseeable future, a vertical split of Landside traffic of departures and arrivals is recommended. This is to avoid having long distances of by-passing traffic on the other side of the Terminal. To avoid vehicular and pedestrian conflicts it is important to establish crosswalks and the two level forecast provides less complications in that respect.

Construction of a new 2-level forecast along the north facade will incur the least operational constraints to the existing Terminal during construction. Extending or copying the present forecast layout on the north and western side of the Terminal is recommended due to operational constraints during construction and it will in the future reduce the expandability of the Terminal.

Generally, private cars should be restricted to short drop-off stops at the departure level of the traffic forecast. Arrival pick-up and short term parking for departures is recommended routed to parts of the parking area to the north of the Terminal, in order to reduce the traffic on the forecast.

Parking

The short- and medium-time parking is recommended located inside the traffic loop. This can be achieved by parking in multistory car parks. Long-term parking and staff parking will be located east of the traffic loop.

Taxis

The new RWY is proposed served by a new full-length parallel taxiway on the eastern side of the runway. The existing and the new runway will be linked east-west with the passenger Terminal linked via a new parallel taxiway. The new parallel taxiway will be part of the new runway link.

From the east-west taxiway link two TWYs will connect to the aprons on the west side of the passenger Terminal and two TWYs will connect to the aprons on the east side of the passenger Terminal.

Existing TWY S3 and G-2 will be replaced by a new taxiway linking directly to the southern extremity of the new runway in order to minimize conflicts with the new ILS equipment for the runway.

Fuel supply

The issue on fuel supply has not been investigated in detail at this point; however the military fuel facility currently located just north of the western end of TWY S-3 is expected for safety reasons to require relocation. It is not normal practice to locate a fuel storage facility so close to a runway centerline including approach and departure areas.

The existing oil fuel storage facility will also be located closer to the new runway than 400m. A detailed safety study will be undertaken during the master plan stage to determine the optimal future location for the civil fuel storage facility.

New cargo facilities

A new Air Cargo Facility is proposed in the north-east area adjacent to the existing TWY N-3. The layout includes an aircraft parking area for simultaneous parking of up to 3 Code E aircraft, a building area of around 800 m², a terminal and a 80 m deep Landside vehicle loading, circulation and lineup area. The Cargo Terminal building will be situated on the Airside/Landside border.

The layout is proposed for a staged construction. A cargo Terminal building having a length of 225 m provides a footprint of 18 000 m² and is expected to have an annual capacity of around 90 000 tons of cargo as indicated for the high demand period of 2030.

The Landside vehicle circulation will have access directly from the primary road network without mixing cargo trucks with the passenger traffic in the passenger Terminal area.

Aircraft Maintenance

Aircraft maintenance is usually provided by airlines or third party providers. It is expected that maintenance requiring hangar facilities in a foreseeable future will be performed in Keflavík. The new cargo facility will be able to serve all the required services.

ICAO has a number of options to meet the primary mode of operation of parallel RWY systems proposed as suggested mode and these changes shall be optimized in order to minimize taxi times and fuel consumption during taxiing. One option for improving this will be to change the location of the north end of the new RWY. This could be done as an acquisition or as a land swap. The additional land should then allow for a location of the new RWY 500-1 000 m further to the north compared to a new RWY fully inside the existing land lot.

De-icing/anti-icing

The new RWY is proposed served by a new full-length parallel taxiway on the eastern side of the runway. The existing and the new runway will be linked east-west with the passenger Terminal linked via a new parallel taxiway. The new parallel taxiway will be part of the new runway link.

By operating on designated de-icing/anti-icing platforms, the time and cost of fuel usage will be achievable. Further operational benefits in terms of reduced stand occupation time, shorter taxi distances from application to take-off and improved efficiency of the equipment will be obtained.

The eastern de-icing platform will be used for take-offs from the existing RWY 02/20 and RWY 29. The western de-icing platform will be used for take-offs from the new RWY and RWY 11.

Airfield Fire & Rescue station

The existing location of the airfield fire and rescue station in the eastern part of the airport will not be able to satisfy the required response times for the new runway. Therefore, a new location of the Masterplan is a number of options to meet ICAO requirements will be analyzed including a new central fire station and a satellite station in addition to the existing station. The new station will include considerations regarding final location of the new RWY ends, existing and new equipment, short and long term CAPEX and OPEX costs.

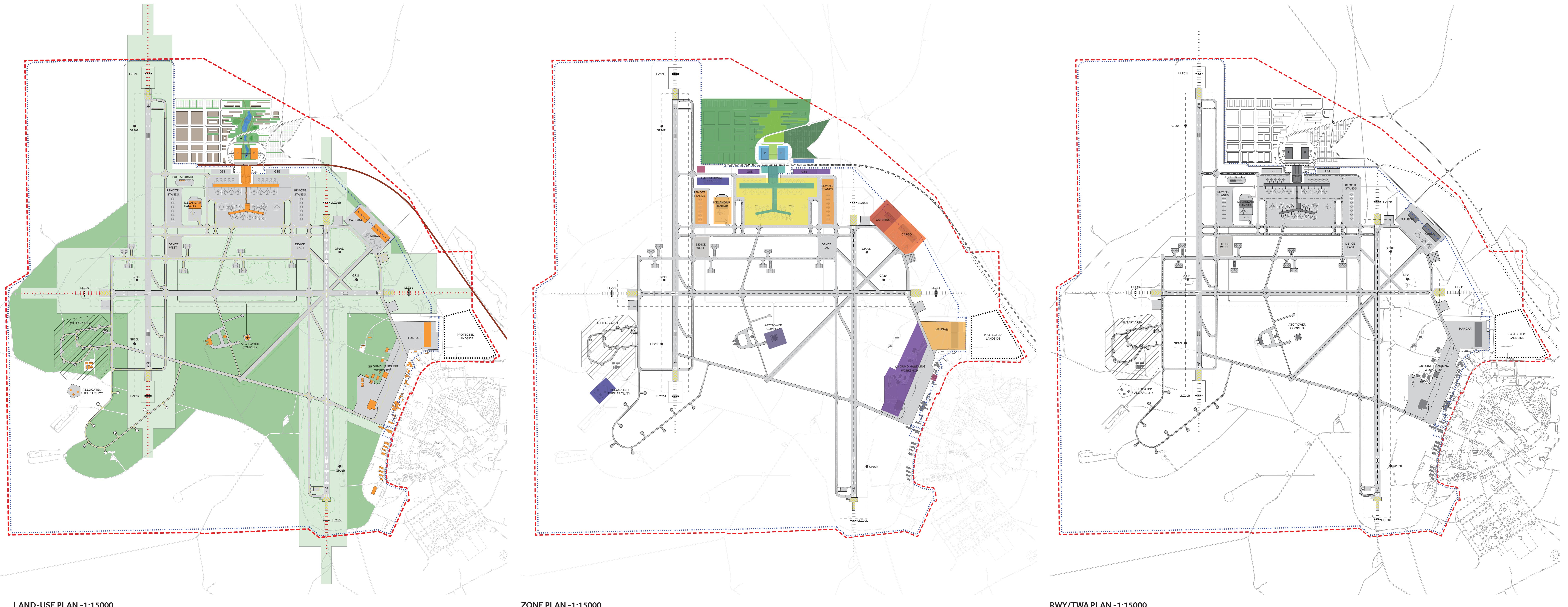
ATC Tower

The existing ATC Tower in the east area will not be able to meet ICAO/FAA visibility requirements regarding the new runway. In order to provide sufficient visibility of six RWY ends, the taxway system in the area will be modified to locate a new ATC tower close to the midline between the two parallel RWYs and around 400 m south of RWY 11/29. At this location it is expected that an ATC tower positioned on the midline around 45 m above ground will meet the ICAO visibility requirements regarding the RWYs. The new ATC tower is expected to have a total height of around 50 m. The tower will be equipped with remote approach control, ground control and apron control, direct visibility of aprons vs CCTV is considered as part of the Masterplan process.

Apron

The proposed apron layout has the capacity of 12 Code E stands and 20 Code C stands as estimated by Leica Fisher 2000. The proposed layout has the ability to serve all the required stands and contact stands fitted with air bridges. In addition to the 2040 requirement remote aircraft positions are proposed for further capacity if needed.

10 Code C stands are proposed on the north side of the apron distribution area, east and west of the ATC tower. The east wing stands are served by an aircraft stand taxilane around the east end of the north pier, while the west wing stands are served by an aircraft stand taxilane around the west end



DESIGN CONTEST NO: 15738
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PASSENGER TERMINAL DEVELOPMENT

Existing north building

The existing Terminal has been developed in multiple phases during the last three decades. The north building and south building have two main passenger levels. The north building's ground floor has one passenger level.

The Terminal has approximately 61 000m² floor area, including the ongoing construction, a relatively large area compared to the yearly passenger throughput, but not sufficient to meet the forecasted growth. The space left empty will provide expansion possibilities for commercial activities and baggage handling.

The significant traffic pattern of Keflavik must be acknowledged, giving high peak numbers, shifts between Schengen and non-Schengen traffic, requiring highly flexible solutions.

Proposed development

The Terminal plan proposal is based on easy orientation, intuitive way finding, and minimum of direction- and level-changes.

Future development of the Terminal is proposed with an expansion of the north building to the north, a new north pier, an extension of the south building to the south, a new south pier, and an option for development of the connection between the north and south buildings.

A number of options have been considered, but the recommendation is to make efficient use of the resources and qualities represented by the existing building, expanding the floor areas and slightly re-organizing the logistics. Expansion of the existing Terminal within an operational airport has been considered and the proposed layout will provide a solution with limited operational constraints during construction.

The expansion of the north building to the north will be constructed as a Landside building site, which greatly simplifies the building process.

The area today a sculptural park with water, but also includes a traffic-free traffic-free forecourt facilities, which need to be replaced.

The expansion will contain two main floors for passengers and have a possibility for a secondary mezzanine. The ground floor contains a new baggage reclaim hall, customs, various services and a lounge area in full. The first floor will have all future check-in and bag-drop facilities and the central security check. The connection to the lounge is based on a double level connection, with direct access on the ground floor and arrivals at the ground level. This eliminates one vertical movement for departing passengers and provides a longer curbside drop-off and pick-up.

The expansion can be designed with a light connection to the existing Terminal, respecting the architectural qualities, and minimizing the need of re-construction of the existing building. The light connection between the new part and the old buildings is proposed to be used as a transition zone, giving the possibility of increasing the floor-to-floor height in the new part, to accommodate for technical infrastructure and baggage conveyed from check-in in the new to the sorting in the existing building.

The new part is recommended with a clear zoning of functions, enabling future expansion towards east and west, securing future needs of changed modes of check-in, security control and in-

creased traffic volumes beyond 2040.

Re-modelling of existing north building

After construction of the new expansion, check-in, baggage reclaim and security will be removed from the north building. The space left empty will provide expansion possibilities for commercial activities and baggage handling.

The expansion area needs to be the requirements are BHS and sufficient to serve the requirements 8MPHA. This gives the needed flexibility for future expansion or re-use of the space in a not easily expandable area.

Maximizing the commercial area in the central area close to the north pier with its many gates, will help generating commercial revenue.

The strategy is to maximize the Commercial area, both on the departure level and on the arrivals level, with high-through shopping areas in the main passenger areas.

The 1987 T-stand will construction-wise remain unchanged, while the south expansion completed in 2007 will be subject to re-fitting of new vertical movements, border-control and improved transfer facilities. The roof will need to be raised and a new floor fitted in.

New north pier

Development of the north pier will be a balance between minimizing investments and maximizing flexibility.

The presented pier proposal is based on maximizing opportunities, now and in the future.

The north pier is proposed connected to the east and west side of the 2007 north building extension. This leaves operational aircraft parking largely undisturbed during construction periods and adequate spacing for future push-back and maneuvering of code B aircraft between the north pier and the south pier and space for snow removal.

The north pier is proposed with two passenger levels. The main option is to have Schengen departing and arriving on the first floor and non-Schengen departing and arriving (non-Schengen) passengers on second floor. This gives a flexible solution for status change of aircraft: both Schengen and non-Schengen flights to be handled at the same gates, without towing (option A).

An optional solution will be possible, with the second floor only in the central part of the Pier. This will reduce the required floor space with approximately 10% and will give more space, but gives reduced flexibility, by having closed waiting areas at gates, which frequently changes in status, serving alternately Schengen and non-Schengen flights (option B).

Another option is possible, with full floors for Schengen (departures and arrivals) and non-Schengen (departures) and a mezzanine for arriving non-Schengen, allowing for handling both secure and non-secure flights at Pier north. This requires a more complex vertical solution, fewer areas and more complex vertical solutions. This option has not been developed further, but is possible (option C).

All above mentioned options are found feasible within the proposed pier footprint.

Connection between the north building and the south building

The existing connection corridor mix arriving and

departing Schengen and non-Schengen passengers, and also have gate lounges. Arriving unclean passengers are security checked before entering the connecting corridor to the north building. This is operationally simple and gives a less passenger friendly process.

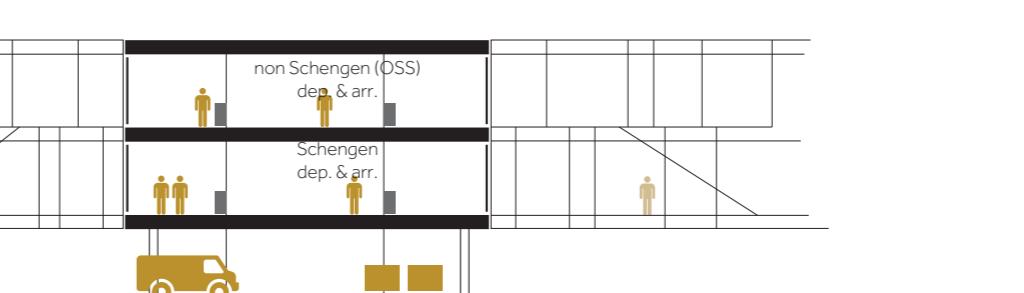
There are several options for dealing with the requirement of the separation of clean and unclean passengers, either keeping the existing solution for the south building, accepting the additional space or separating personnel either use private cars to a separate entrance or shuttle, using the same entrances as passengers, and parking the vehicle in a security lane adjacent to the central security facility.

Personnel using other access points, closer to their work-sites, will continue using these. Changing rooms, restrooms and other facilities for personnel needs to be developed further.

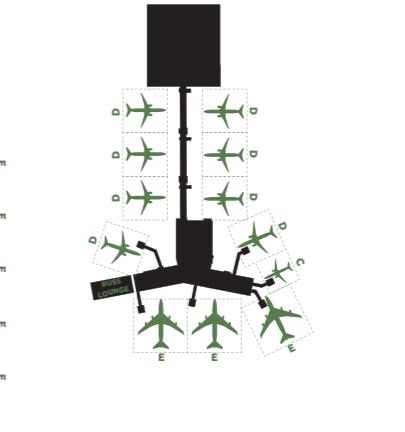
Goods and waste management

Goods and waste handling for the Terminal is proposed located at the eastern side of the Terminal. The access road to the goods area of the access road as early as possible, avoiding mixing passenger traffic and service vehicles.

The access road for goods is proposed combined with the road to the future Cargo center east of the Terminal.



PIER SECTION / OPTION A



2015: AIRCRAFT STANDS

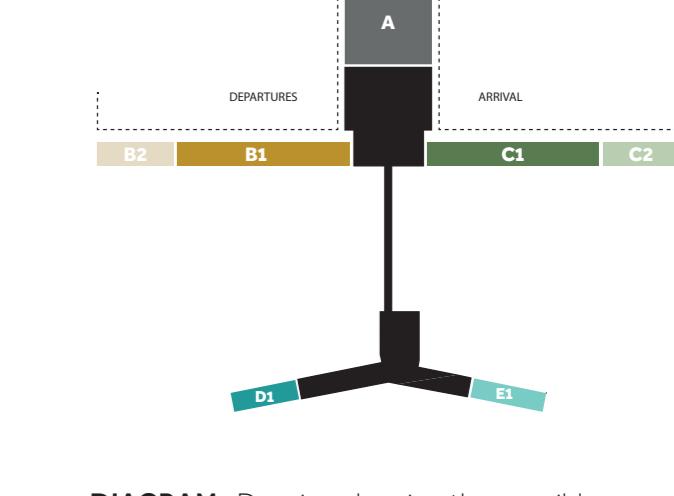
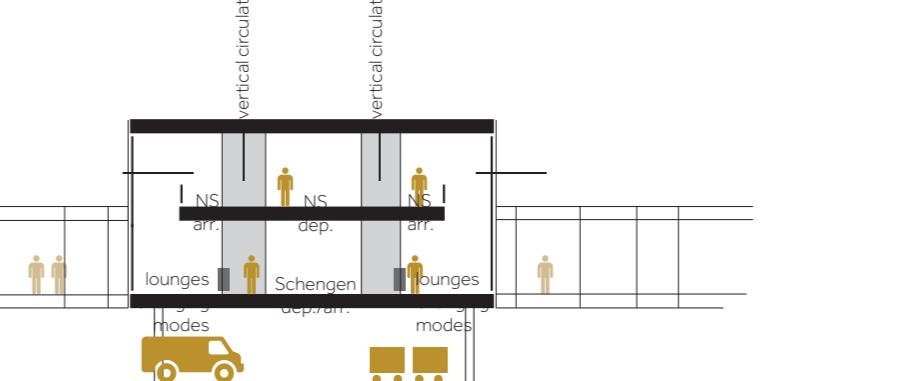
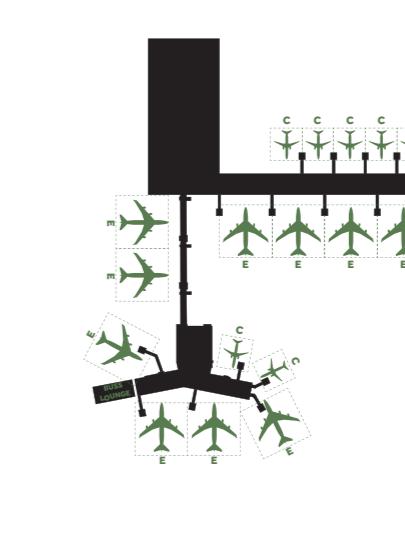


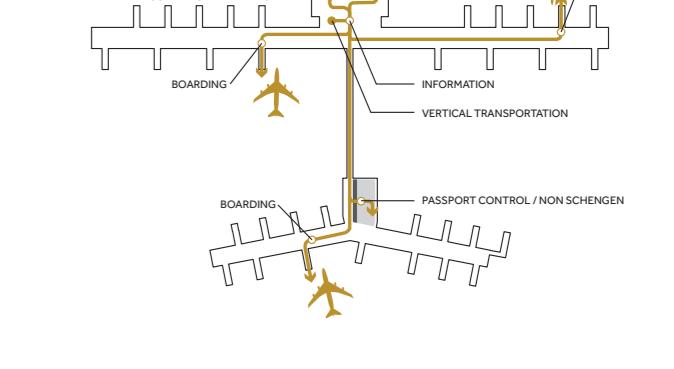
DIAGRAM: Drawing showing the possible phasing elements



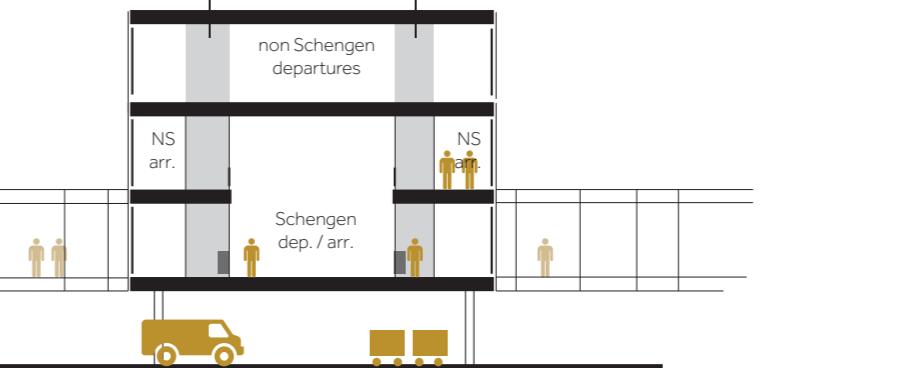
PIER SECTION / OPTION B



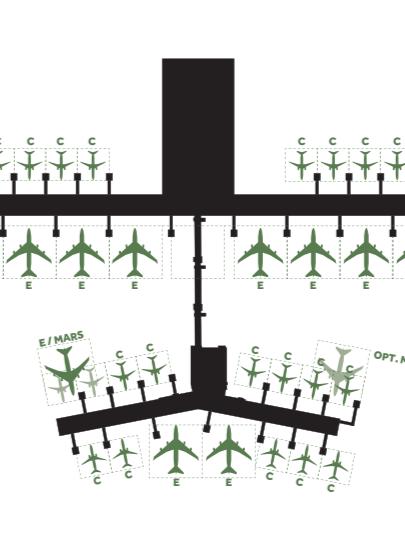
2025: AIRCRAFT STANDS



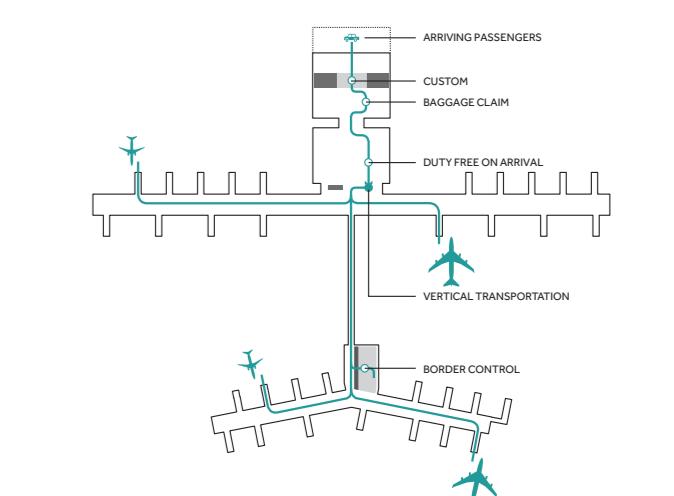
FLOW DEPARTURES



PIER SECTION / OPTION C



2040: AIRCRAFT STANDS



FLOW ARRIVALS

