TU Delft

Delft University of Technology

Campus vision 2040

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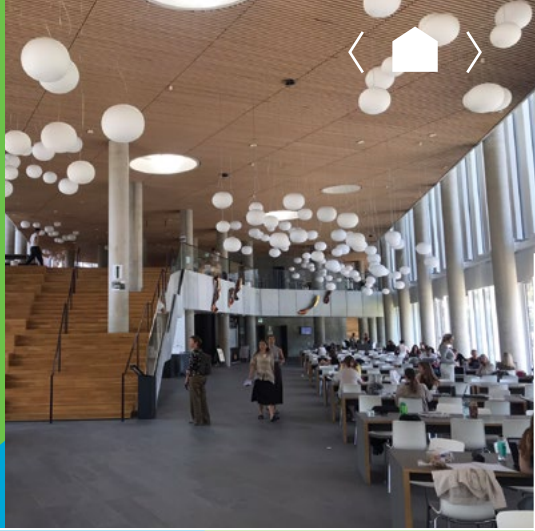
CAMPUS VISION 2040

TU Delft



Preface

The TU Delft campus plays a crucial role in the education and training of our students and offers an attractive work environment for our employees. It's an inspiring and challenging environment with cutting-edge facilities where groundbreaking scientific research, excellent teaching, and innovative cooperation with the business community all come together. It also serves as a meeting place for our community, visitors, and local residents.

This document provides a future perspective of a continually developing campus with a 2040 horizon. This perspective applies only to the campus in Delft. In parallel with the development of the campus vision, a vision is also being developed for the organisation of TU Delft, under the name of Contours 2030. The latter also explores whether growth of the university can also be realised at other locations besides Delft. This campus vision does not yet take this into account.

The campus vision serves as the strategic compass for the (re) development of the campus in the coming years. This will enable the campus to contribute to the implementation of the strategic agenda of TU Delft: finding solutions for global challenges and pushing the boundaries of technology and the sciences. As such, it will allow us to continue providing an inspiring and challenging environment in the future as well as having an impact on the creation of a better society.

Ms Marien E. van der Meer, MSc
Vice President Operations (VPO) / member of the Executive Board

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1. Introduction

In 2040, TU Delft is not only a global player in research, teaching, valorisation, and innovation. The TU Delft campus in Delft also serves as its visiting card to the world. Here we show how all campus users cooperate on solutions for major societal challenges.

The sustainable campus in 2040 is an attractive neighbourhood within Delft for TU employees and students as well as employees of businesses, residents, students from other educational institutions, and visitors.

This mix of people winds its way through an attractive and climate-proof outdoor space alongside accessible and sustainable buildings and a great many field labs, where research and teaching activities are very visible. Buildings can be used flexibly, and the vibrant outdoor space is dotted with various pavilions and a great many free spaces. The various developments on the TU Delft Campus and the surrounding neighbourhoods strengthen the close relationship that exists between TU Delft and the city of Delft.

The TU Delft Campus 2040 showcases technical innovations from the University, Institutes of Higher Education, and businesses, forming one large living lab. In 2040, the Delft Campus is visibly sustainable in all its facets: technologically, ecologically, and socially. In retrospect, compared to 2023, the 2040 mix of users, residents, and visitors in large numbers is strikingly different. The number of students on the Delft campus will not increase significantly in comparison to 2025. The biggest increase will be in the number of people employed by companies and the number of residents on the campus.

Management summary

Campus Vision 2040 is based on existing visions on specific topics and input from users and stakeholders on and around the TU Delft Campus. This Vision provides a framework for real estate and area development, and describes what the campus will look like in 2040.

The Vision is based on overarching basic principles and provides a spatial visualization from five perspectives. The following overarching basic principles serve as guidelines: sustainability, digitisation, shifting fields of research, valorisation, and the growth and change of the campus population. Building on the above, the campus will deal carefully and responsibly with its heritage and will showcase how TU Delft can contribute to building the city of the future.

Campus Perspectives

The five perspectives describe what the campus will comply with in 2040.

1. The campus is an inseparable part of the city of Delft and, in 2040, is a multifunctional space where people live, work, and enjoy life.
2. It encourages people to meet each other via green public spaces that offer a pleasant environment. For students, it provides a space for social encounters and personal development.
3. The campus is a place for interaction and cooperation. It houses a vibrant ecosystem in which teaching, research, and innovation come together and strengthen each other.
4. The campus is inclusive. It's a part of the city where students, employees, businesses, and the residents of Delft feel very much at home.
5. The buildings and public spaces can be modified to meet the demands of a rapidly changing world. The campus combines various functions intelligently so that it remains a vibrant place not only during the week in the daytime but also in the evening and weekend.

Spatial visualization

In 2040, the campus serves as a global example of a liveable and sustainable campus that is effectively connected to its external surroundings, the city of Delft, and the wider region. What this means has been worked out in a spatial visualization per subsector. The focus hereby is on traffic and mobility as well as densification, climate adaptation, and design of the public space.

Follow-up steps make it clear that realising this campus requires policy and interventions as well as a structured form of cooperation. Consultations with all stakeholders, including students, employees, businesses, and in particular the residents of the Municipality of Delft is needed to accomplish this goal.

From 1842 to 2023

TU Delft has its origins in the Royal Academy for the training of civil engineers. Established in 1842 and located on the Oude Delft, in 1864 the Academy became the Polytechnic School in Delft. As a result of ongoing industrialisation, the number of students continued to grow, leading to an expansion and new buildings along the Schie on the south side of the city centre. Then, after World War I, the expansion continued with new buildings on the other side of the Schie in what is now Campus North.

After World War II, there was a great demand for more engineers, and the university went through a period of enormous growth. In 1948, a rational expansion plan was drawn up to accommodate this growth. The centre of gravity then shifted to the area now called Campus Midden. The above plan had the following goals: create opportunity for expansion, create a connection between the city and the university, and ensure that the new development and the existing university buildings are effectively connected. At the time, students mostly found accommodation with a landlady and student housing was not part of the plan. When the newly developed TU neighbourhood first opened its doors, the campus was subjected to criticism. The large-scale Mekelweg suffered from a lack of vitality.

Two major changes took place in the early 1990s. In 1995, the university became the owner of the buildings and the campus grounds (169 ha), and for the first time the number of students started to decrease. This decrease was caused by the emergence of programmes offered by universities of applied sciences as well as demographic circumstances. At the end of the 20th century, this resulted in the divestiture of buildings in the city centre of Delft and a more sharply defined division into three locations: Campus North (linked to the city through the technology museum and faculty club), Campus Midden (teaching and research), and Campus South (TU related companies).

Although a master plan was prepared in 1997, it was never implemented and replaced by the 2000 master plan. The Mekelweg became the Mekel Park, and access was reorganised via a ring road. Over time, student housing was added in small segmented projects even though this was never part of the successive master plans. In 2013, Campus Vision 2030 was approved.

1.1 Note to readers

The student population, valorisation & innovation, the research programmes, and the organisational structure of the University are all changing more quickly than the built-up environment. Nevertheless, we are already making decisions today about the use and layout of the space available that will have a great impact on the University, the campus, and the city of Delft in 2040. The vision described in this document takes a continually changing context into account: What do we have to do today in order to facilitate the users of the TU Delft Campus in 2040? To answer this question, we have to consider the physical context of the campus and also look further than the grounds of TU Delft itself. The vision also takes into account a number of long-term uncertainties.

The vision was drafted in co-creation with the campus community. In addition, the visions and reports on specific topics are at the basis of this document. The 'story' presented here is based on overarching basic principles and provides a spatial visualization from five perspectives.

A separate, more detailed explanation is available for this vision, which includes the workshop results and background data.

Basic principles

Regardless of uncertainties, the parties consulted – including researchers, third parties providing a vision, workshop participants, and campus users who were interviewed – all agree clearly on the basic principles for a vision of the campus. The TU Delft Campus 2040 is in the first place and primarily a sustainable campus that builds further on our heritage.

We are increasingly developing ourselves further as an 'ecosystem' for teaching, research, and successful innovation-focused policy. In addition, the campus will increasingly develop into an environment where people live and stay for longer periods of time, and that also provides a broader range of facilities. The latter is based on the realisation that studying is more than just following a degree programme; it is an important and defining phase of life.

The campus in Delft in 2040

The overall picture is one of a lively and multifunctional campus that is a vibrant component of the city and a global leader. This is evident from five perspectives: - the campus as a city - the campus as a meeting place - the campus as an inclusive space - the campus as a place for cooperation - the campus as an adaptive entity. These five perspectives complement each other. Each perspective first describes the picture of the campus in 2040 from its own perspective, after which it provides some tips and tools for the development of the campus in Delft from the present day until 2040.

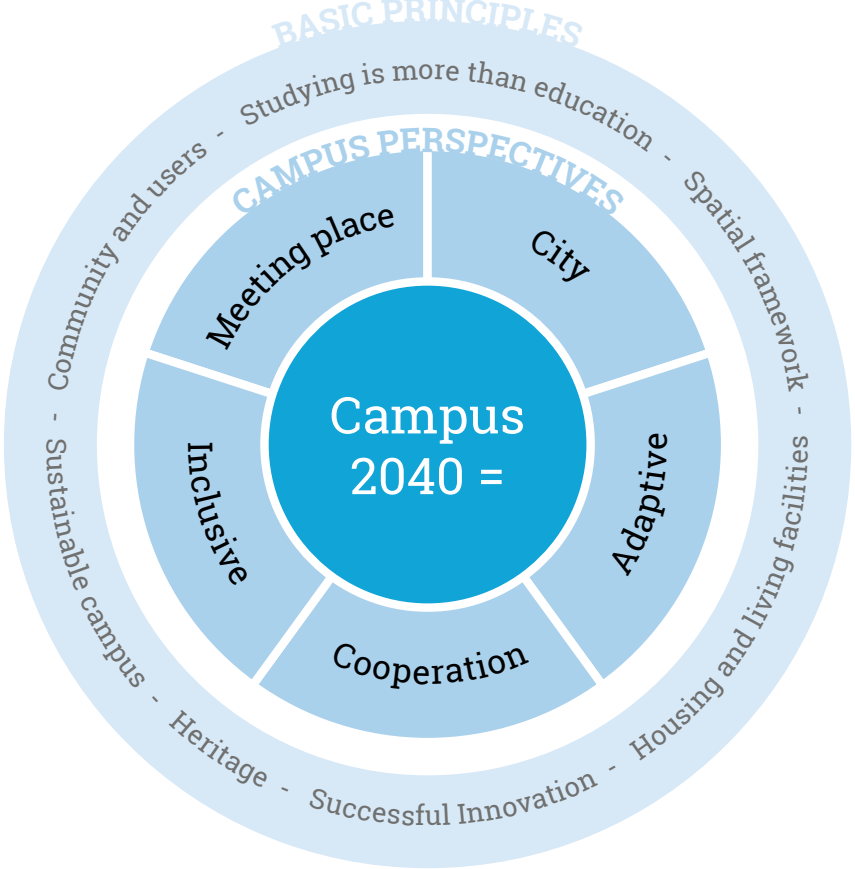
The spatial interpretation

The vision is a description of the Delft campus in 2040. The spatial interpretation of the vision works this out in concrete terms. What interventions are needed to realise the campus of the future? These are views for the entire campus and for parts of it. The spatial interpretation will have to be reassessed anew on a regular basis. Are we still on the right path, and do changing circumstances require any modifications? The spatial interpretation will also be influenced by financial opportunities and constraints as well as the strategic framework of the University.

Conclusion

Campus Vision 2040 applies to the campus in Delft. TU Delft developments will also take place at other locations in the Randstad, and these will have an impact on the Delft campus in future. The exploratory work for these developments has been carried out by the Profile and Scope Committee (2022). In view of the attractiveness of the TU Delft Campus 'ecosystem' and the developments around the campus, it is quite likely that the campus in Delft will become more densely populated.

The campus is an attractive breeding ground for companies and start-ups in Delft. The campus will also be a residential area with various facilities. In addition, the goal of the University, now and in the future, is to be a global leader in its field, which will ensure that the TU Delft Campus continues to attract students and scientists from all over the world.



The vision is based on overarching basic principles and provides a spatial visualization of the campus in 2040 from five perspectives.

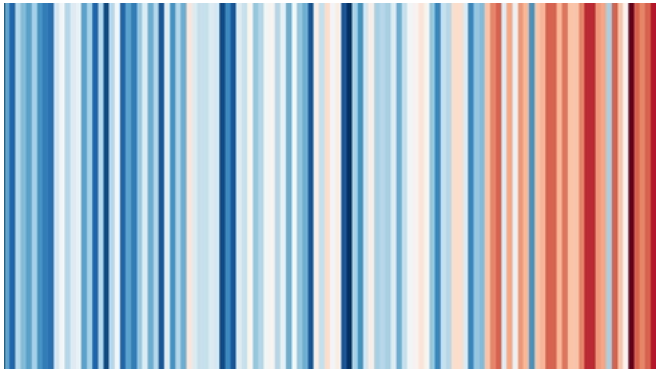
1.2 Goal

Once every six years, TU Delft re-assesses its Strategic Plan. In doing so, the focus lies on the people, the TU Delft community, and the activities developed by TU Delft in teaching, research, and valorisation & innovation. Six years is a length of time that encompasses a number of uncertainties such as student numbers, the job market, and socio-economic developments. However, when it comes to decisions regarding the utilisation of the available space, six years is too short a timeframe. Interventions in the urban environment and decisions regarding new buildings and transformations have long-term consequences.

The TU Delft Campus Vision 2040 sets out guidelines for transformations and new developments for TU Delft. The vision sets out a framework for real estate and area developments. Support and involvement are an essential component of the vision, and this also implies an ongoing interaction with the campus community, including various stakeholders and local residents.

This vision is in line with the Delft Environmental Vision: The TU Delft Campus is an inseparable part of the Wippolder neighbourhood and city of Delft. TU Delft is aware of the impact that an international top-level university has on the campus, the neighbourhood, the city, and the region.

Finally, the Delft campus vision provides a framework for the campus strategy and is also the focal point where various visions on specific subjects meet each other. At the same time, this vision aims to link up with visions of adjoining city districts such as Schieoevers North. At a higher level, it also takes into account the framework set down by the province with regard to (un)limited technology and national research on the added value and development of campuses in the Netherlands.



The climate barcode for the period from 1901 until 2020 shows how our climate changes. The colour of the barcode indicates the average temperature per year: blue stands for a relatively cool year, and red for warmer years.

1.3 Vision of the future in 2040

To quote a future student in 2040: *'I enjoy visiting the campus on Sunday, where I can meet other students or alumni now working at a start-up. There are also so many different nationalities living on the campus and there's always something interesting happening. We then usually go to a show together or play an Augmented Reality game on the campus'.*
- MSc student from Kenya, 2040

The functions of the campus

In 2040, the population of the campus will have grown and become very diverse. Innovative companies, residential housing, facilities and amenities, teaching and research activities all play a role in attracting students and professionals from all over the world. Much more than it is now, the campus will then be a place for people to gather and meet each other. The links with universities of applied sciences, MBO institutions (Senior secondary vocational education), and the manufacturing sector as well as the role of the campus as a living lab all contribute to further expansion on a national level. As a result of ongoing global population growth, increasing numbers of students will arrive from Africa as well as Asia and Latin America. All this will have an impact on mobility.

The demand for engineers (BSc and MSc) depends on developments over time, which means that the student numbers in 2040 are uncertain. At present there is a strong demand for more engineers, and the University has a strong attraction for students internationally. Also due to lessons from the past, we assume that the University will grow further. This vision also looks at the implications of the above for the Delft location. The need for housing is in any case acute now and will remain so in future.

Digitisation

Innovations in digitisation have a great impact on research, teaching, and valorisation. Developments in artificial intelligence will not only influence the content of such work but also change how people work (together). Digitisation (such as a Digital Twin) has a great impact on the (efficient) utilisation and management of the campus.

Climate

In 2040, extreme weather conditions – wetter, drier, hotter – will no longer be the exception. Proactive measures will have been taken to adapt the public space, the built-up environment, and the position of the campus user to climate change.

City of the future

The TU Delft Campus demonstrates what the city of the future will look like. Through the deployment of new (mobility) technologies, digitisation, sustainable planning, and co-creation, it shows how we can cooperate and live on a campus that is an integral component of Delft. Maintaining our heritage and making it sustainable is part of this vision.

1.4 Vision creation

This vision was developed in cooperation with the campus community/communities and various stakeholders. To optimise the content and commitment, it is also a very good idea to again reassess the vision together with all the parties concerned at regular intervals in the future. The vision has made use of the many existing partial visions on specific subjects and other sources that deal with (parts of) the campus and the context. Workshops took place on specific topics as well as interviews, roundtable discussions, and observations. Within that context, we involved as many groups as possible within the campus communities, and the municipality, province, water board, and other parties were also present. A separate, more detailed explanation is available for this vision, which includes the workshop results and background data.

Impressions from the workshops and the central meeting in Lijm en Cultuur, 3 October 2022.

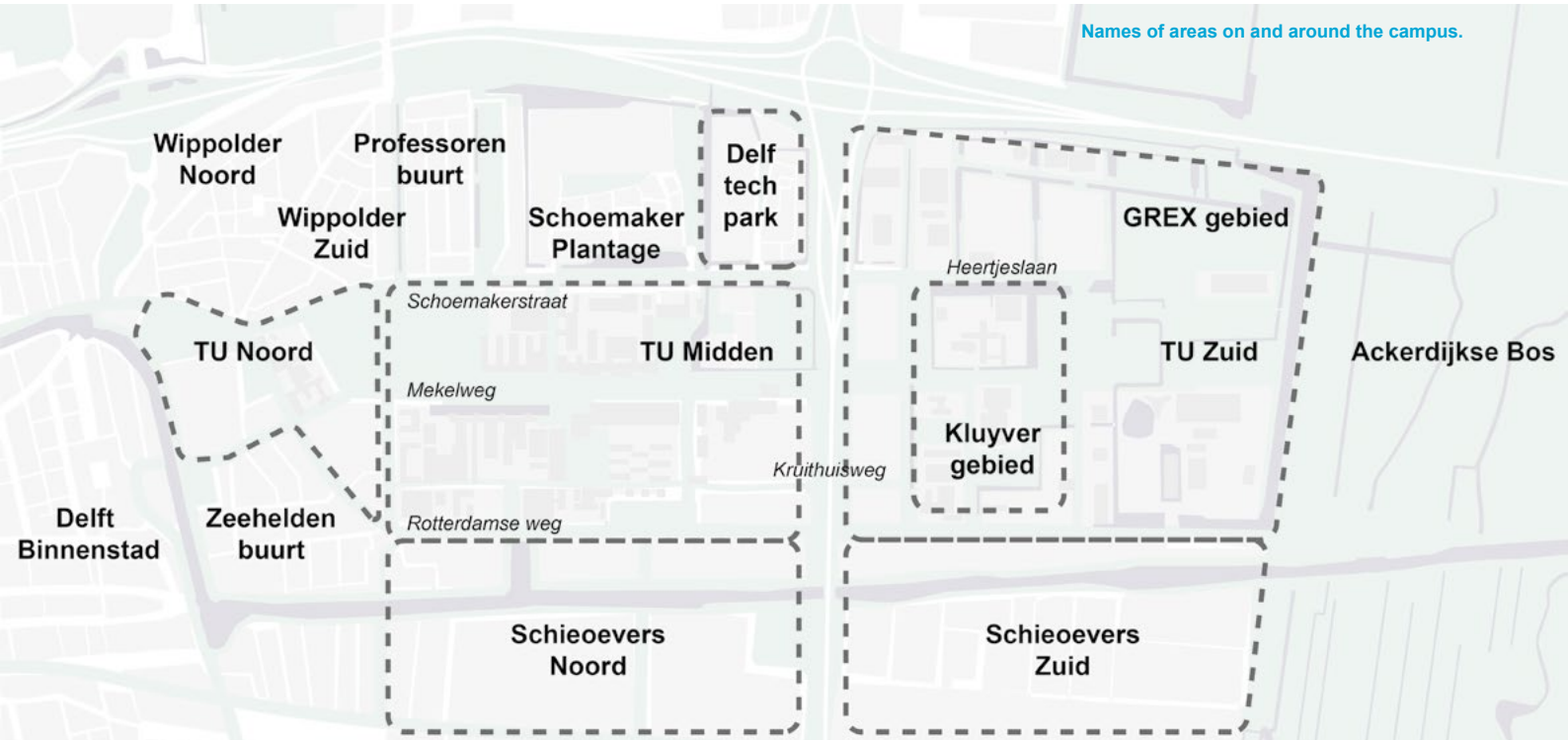
1.5 Physical context

'Delft should be more a part of the identity of the TU and vice versa.' - Delft University of Technology and Municipality of Delft (2017). Good neighbours - Cooperating on an inclusive city.

The Wippolder neighbourhood is larger than the area owned by TU Delft and therefore also has a great many users that are not part of TU Delft, such as the residential neighbourhoods and businesses on and around the campus. The development of the Schieoevers has a direct impact on the TU Delft Campus, as well as an indirect impact by enabling a better relationship between the Campus and Delft Zuid-West.

The Kruithuisweg is a major traffic artery for Delft as well as a link in the national network of motorways. At ground level, the road in its present design is a barrier between Campus Midden and Campus South. In addition, TU Delft, in spite of its role as a leading university, is almost invisible to the traffic passing by and therefore not really part of the Delft urban landscape.

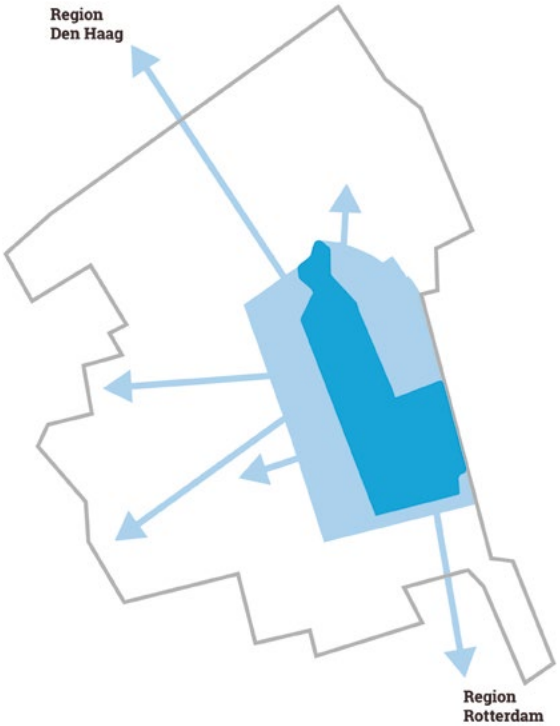
Names of areas on and around the campus.



2. Basic principles of the campus vision

'Who we are is in large part determined by our history of learning and the environment in which we find ourselves' - Prins & Emmerik, 2020.

The TU Delft Campus vision has several different basic principles: we strive for a sustainable campus and we build further on our heritage. In addition, our innovation-focused policy has implications for the use and design of the space available as does the demand for residential space. It's also important to realise that the campus serves many different users, whereby facilitating the development of young adults is an important role of the University and the campus. Finally, the physical framework needs to be defined: what precisely do we define as the campus?



The TU Delft Campus is part of the city of Delft and the surrounding region.

Fully wooden high-rise building, Sara Kulturhus, Skellefteå (SE), a culture centre with theatre, library, conference halls, and hotel (White Arkitekter).

Teaching & Research

TU Delft has a national and global reputation as a leading institute of teaching and research. In 2040, this primary function of TU Delft will undeniably also be part of the programme on the campus. Exactly how this function will be interwoven with the campus is still unknown and will depend on various developments and possibilities that present themselves in future (e.g. digitisation). 'However, it is clear that we will develop the campus into an inspiring "free port" that invites and encourages students and staff to excel' (Delft University of Technology, 2018).

A successful policy focused on innovation

The campus is an environment in which cross pollination takes place between knowledge institutions and enterprises. This form of cooperation is also referred to as the 'ecosystem'. The ability to share facilities and modern mobility solutions will improve the cooperation between teaching, research, and innovative companies on the TU Delft Campus.

Green Park, Reading UK (Place Design + Planning).

A sustainable campus

The vision ‘Sustainable TU Delft - vision, ambition and action plan for a climate university’ (van den Dobbelsteen & van Gameren, 2022) is an inseparable part of Campus Vision 2040. It provides a framework for all developments and sketches a level of ambition that raises the quality and image of the campus as a whole to a higher level. In addition, the Climate Action Programme 2021-2030 serves as a good guideline for the sustainable action points (Delft University of Technology, 2021).

Heritage

The biggest part of the campus of 2040 already exists. In the next chapter, this vision will emphasise the importance of adaptability. However, this does not mean that everything will be subject to change: every university cherishes its historic buildings, as these contribute strongly to its image and identity. Its heritage is a tangible reminder of the university’s history.

The Aula Building, a heritage building and icon.

In addition to its heritage and historic architecture, there is also place for some new iconic structures, which will serve as benchmarks that place the campus (and therefore the University) in a specific timeframe.

Housing and living facilities

‘In 2040, the campus has developed into an integral part of the city with urban functions and an attractive living environment. New large-scale clusters of student residential facilities have sprung up primarily on and around the TU campus.’ - Municipality of Delft (2021). Delft Environmental Vision 2040 - ‘Together we make the city!’

As a result of the increasing student numbers and the housing shortage in Delft, housing, mobility, and accessibility will form a substantial part of the challenges faced by the TU Delft Campus. The availability of housing on the campus for students and other target groups contributes to the vibrancy and liveability of the campus and reduces pressure on the city itself.

Shared residences on the campus, Schermerhornstraat (Cepezed).

New forms of shared living arrangements not only contribute to a more efficient use of the available space but can also prevent loneliness under single person households. Residential spaces also require relevant facilities and amenities.

Community and users

'A campus is a community as well as a location'.
- a participant in the Teaching workshop

The campus has a great many groups of users: students, staff of TU Delft and universities of applied sciences, employees of companies and institutions, campus residents, neighbouring residents, and visitors coming for business as well as recreational purposes. Users can be members of various communities from various perspectives such as culture, academic background, et cetera. As a location, the campus encourages unity in diversity: a community consisting of many different sub-communities.

Studying is about more than teaching alone.

For students, the campus is also a place of (personal) development. The living environment, the functions, and the programme all contribute to this. Within that context, learning on the campus should be viewed separately from doing a degree. The campus is also a place where you like to be.

The campus is an inseparable part of Delft (TU Delft Strategic Framework 2018-2024).

The physical framework

The campus is used by a wide range of persons. Different people have a different experience of what ‘the campus really is’. However, there is some degree of consensus as to what is or is not a part of the campus or is so only to a lesser degree. It’s clear that, in the vision, we look past the borders of what is officially owned by TU Delft (the campus grounds).

This is important as a great many developments are taking place around the campus grounds, including the Schieoevers transformation, the Delft Campus station, and Gelatinebrug. It’s important because TU Delft is an inseparable part of the campus and of Delft. In addition, the University is a component of the Dutch knowledge industry and a network of campuses.

The TU Delft grounds owned by the University (dark blue); the campus is intertwined with the surrounding neighbourhoods (light blue).

3. Vision 2040: five perspectives

In 2040, the campus will be an attractive working and living environment for talented researchers, employees, students, and the leading group of innovative companies. The TU Delft Campus is a lively, diverse, and inclusive environment seven days a week 24/7. In 2040, the campus is a green and climate-proof campus. On the global map of campuses, Delft is a leading example of a campus where it's fun to stay and technological innovations are highly visible.

The 2040 TU Delft Campus is described from five different perspectives. Each perspective is accompanied by a description of the steps that need to be taken. The five perspectives are quality criteria that are central to the development of the TU Delft Campus going from 2023 to 2040.

3.1 Campus = city

Lively, connected, and accessible

'TU Delft can contribute by making local involvement (community engagement) an integral part of the vision and mission of the University… The city can contribute by providing assistance for initiatives and eliminating obstacles. This ensures not only that the city and the University become better neighbours but also that the academic community becomes more a part of the city and vice versa.'

- Good Neighbours, collaborating on an inclusive city – advice from the concept developers, 2017

Vision perspective for 2040

In 2040, the campus is a full-fledged component of the city of Delft and is in every which way connected to the rest of the city, literally and figuratively. The campus focuses not only on the North-South axis (linkup with the city centre and the Ackerdijkse Bos), but also strengthens the East-West connections. The R&D activities on the campus are integrally linked to the business activities (prototyping and production) on the Schieoevers and the Delftechpark. The city is a living lab, and the University contributes to a liveable, sustainable, and inclusive city as well as the innovative climate of the entire city of Delft and the surrounding region.

In 2040, the campus has risen to a higher level of quality, characterised by a mix of functions and users. The function of the campus has grown from the three pillars of teaching, research, and valorisation & innovation into a broader range of functions including housing and related facilities and amenities. The facilities available on the campus, including restaurants, cafés, shops, a hotel, and possibly a public swimming pool operating on residual heat, provide an attractive mix for the daily uses of the campus as well as the residents of Delft and (international) visitors.

The residents of Delft can make use of TU facilities such as the Aula Building, Science Centre and Library. Last but not least, the campus also provides facilities for music and youth culture.

'Campus = city' implies that the TU Delft Campus is seamlessly connected to the newly developed Schieoevers and also seeks and maintains a connection with the city centre and the neighbourhoods to the East of the Schoemakerstraat. Campus North is a visiting card for TU Delft and links the campus to the Delft city centre. The heritage of TU Delft is also the heritage of Delft.

Campus Midden and Campus South are connected to each other via attractive routes under or over the Kruithuisweg.

The transition from 2023 to 2040

- A radical and innovative mobility policy for all user groups, whereby public transport and (shared) two-wheelers are given preference over (E-)vehicles, and technology provides the necessary assistance. The result is more slow traffic (the ‘last mile’) and an improved quality-of-life for those staying on campus.

- An extra housing function – for students as well as knowledge workers – will benefit the quality of the campus and its relationship with the city, taking into account the various nuisance zones associated with the present functions of the campus. Temporary housing is a component of the housing programme.

- The visibility and accessibility of the campus are important factors: this involves, on the one hand, a new programmatic approach and, on the other, raising the visibility of teaching and research in the existing programme.

- An integrated landscape plan is the foundation of the campus itself (and its connection with the surroundings). The plan also describes the sustainability goals, such as a better microclimate and improvement of the biodiversity and water storage capacity.

- The formal centre of the campus is the cluster formed by the Aula Building and Library, which may be expanded with a main entrance along Lorentzweg 1 (redesignation of north side of building 22).

- The Rotterdamseweg is an important axis running through a vibrant area that contains living space, working space, the University, a university of applied sciences and MBO institution. This historic axis will again become a front side – for the campus as well as the Schieoevers.

- A programmatic exchange with the Municipality of Delft strengthens the relationship between TU Delft and the Municipality of Delft and offers both parties opportunities for tackling the scarcity of space. In particular, opportunities are available in Delft-West, in cooperation with the Biotech campus, and around the Delft Campus station.

Delft Southeast develops into an Innovation District, and the improved East-West access routes ensure that the subareas become more integrated (DZH).

3.2 Campus = meeting place

Social cohesion, cross-pollination, and informal encounters

'We create UniverCity Delft, a vibrant campus that is attractive to students, employees, businesses, and visitors by: Investing in public spaces for meeting others and private spaces for concentrating ….'
- TU Delft Strategic framework 2018-2024.

Vision perspective for 2040

In 2040, the campus is an attractive place to be for all user groups including visitors from all over the world. 'Being on campus' is not meant only for working and studying, as the physical environment encourages (unexpected) encounters. A key element is the typology of the 'cluster' as described in the Spatial Development Perspective (Posad, 2019) and worked out in more detail in the Vision on Shared Facilities (TU Delft, 2021. A cluster is an area where people stay for longer periods of time and where facilities for working, learning, eating, relaxing, and meeting others are located at walking distance from each other.

In 2040, buildings will have vibrant plinths (ground floor) making it possible to see what there is to do inside. Vibrancy is related to the number of front doors to the public space. More doors result in better accessibility and more potential places to meet other people. This can be combined quite effectively with stacking (or combining) different functions in the same building volume.

As early as 1971, Van den Broek, one of the designers of the original plan for the TU neighbourhood in 1947, presented proposals for pavilions in the present Mekel Park. This was intended to promote a feeling of liveliness and to inject a more human dimension into the Mekelweg.

In 2040, these smaller buildings with more 'human' dimensions dot the entire campus. They house catering facilities and café's, serve as 'free space', as meeting or teaching rooms, as showroom, or as the home base of a specific student group such as an association of international students or Green Teams.

In 2040, the outdoor space will be more attractive to 'hang out in' due to the presence of (roofed over) seating as well as easy-going sports facilities all over the campus. In addition, the outdoor space encourages walking (ambulatory meetings, outdoor art) and bicycling. In 2040, the microclimate will be very much in focus: trees, tree-lined walkways, water bodies, and much fewer paved surfaces in combination with increased biodiversity. The liveliness of the public space is also due to the diversity of programmes available, in particular functions that are also accessible in the evenings and during the weekend, such as: attractive restaurants and cafés in the evening.

A sustainable and lively public space is also strengthened due to the fact that, in 2040, teaching and research facilities will also be used on a regular basis in the evenings. Examples of this could include: film/debate evenings in empty lecture halls, AI labs were children of local residents can go to in the weekend, or evening courses to make more efficient use of the available teaching space.

The transition from 2023 to 2040

'Although digitisation enables students to study outside the campus, universities indicate that students are actually present on the campus and wish to be there more frequently.'
- from Campus NL by TU Delft Campus Research Team led by A. den Heijer.

- As the main user of the campus, TU Delft is an on-campus university that will become increasingly vibrant in the coming years as a result of the strategic choices made. In particular, the role played by the campus (and the University) in the personal development of students takes place on the campus in cooperation with X, the Library, the Science Centre, and ESA. This will become an important component of the 'engineer of the future' and also contribute to the social resilience of the TU community/communities.

- The potential offered by digitisation and technological developments in the realm of teaching also makes it possible for online teaching (and working) to play a larger role in teaching and research. Digitisation contributes to improved online and off-line programmes and therefore to a more efficient use of the available space.

- The lessons learned from the COVID period motivate the further development of hybrid teaching to ensure that students with a disability and those who are stuck at home due to sickness or cannot travel due to regulations can also participate fully in the teaching programmes.

STUD plays football during the breaks on the square in front of Mekelweg 1.

3.3 Campus = inclusive

Unity in diversity

'We consider diversity to be a precondition for excellence and innovation'.
- TU Delft Strategic framework 2018-2024

Vision perspective for 2040

In 2040, the campus is an attractive and socially safe part of Delft, hosting a wide range of active international users. As a result, the campus doesn't serve just one community but rather a colourful collection of various communities. This therefore also explicitly includes: students at Universities of Applied Sciences (HBO), start-up employees, business visitors, and everyone who has his or her own relation to the campus. By recognising, facilitating, and respecting everyone's needs, a diverse and inclusive palette of users becomes visible on campus. In addition, there are a great many places and venues where people can meet each other, within a single community as well as within various communities. This encourages mutual interest between different groups as well as acceptance and understanding.

Festival of colours, Indian Holi Festival, TU Delft, 2019.

Inclusiveness requires a sufficient number of places to meet each other as well as sufficient opportunities to avoid social interaction in the form of 'quiet spots'. These campus users can go their way enjoyably and safely, and that is also part of inclusiveness.

In 2040, the shared facilities are focused not only on the diversity of campus communities but also aim to make the campus a more attractive place for residents of Delft and people from outside the city. In 2040, the meeting places, such as a pavilion, facilitate groups of users who were previously less visible on the campus, including international students or employees, residents, LGBTQ+ groups, and innovative companies. The campus complies with the guidelines for Socially Safe Design (Luten, 2008) such as visibility (overview, sight lines, and lighting), social control, lively plinths, and effective public transport also during quieter hours such as evenings and weekends.

The transition from 2023 to 2040

- The development into an inclusive campus requires a two-track policy. On the one hand, attention needs to be paid to ‘invisible’ communities or those that are underserved. For example, Delft has a rich history of student societies that have traditionally played an important role in the life of the city. This is much less so for the newer student societies such as the international student societies. A great many activities and celebrations, such as Diwali for example, have a great deal of value but are hardly facilitated on the campus, although this is very necessary to ensure that these groups also feel at home and safe on campus. The second track thinks not only in terms of groups but also in terms of individual lifestyles. How is the campus experienced by a new PhD who mainly wishes not to be disturbed while remaining on campus 24/7? In addition, most users will be members of several communities. For example, a student can be an active participant in the BioMedical Engineering programme, a member of an international student society or sports club, and an active resident of a campus housing complex.
- In the coming years, the various user groups will have more opportunities to raise their visibility on campus, for example via the shared use of public space (indoors and/or outdoors).
- Bildung will become a more natural component of student life. In terms of the physical space, this will be facilitated by the sharing of facilities as well as by encouraging the informal ownership of the public space. This demands more ‘free spaces’ of various qualities: for example covered spaces for temporary use by green teams and other student organisations, as well as green areas where gardening opportunities are available.
- Accessibility for everyone and social safety are preconditions for inclusiveness. Public transport bicycles and (shared) two-wheelers will therefore be prioritised, and autonomous transport (or other last-mile solutions) will be deployed for linking up with the Delft Campus station. In addition to innovations in the area of mobility, visibility (seeing and being seen) is also a component of socially safe routes to Campus South.

3.4 Campus = cooperation

Cooperation & exchange leads to innovation

'The Ecosystem needs physical spaces where students, researchers, and companies can meet each other, and these meetings need to be actively encouraged'.
- Buck Consultants, 2022, The Strategy & Roadmap TU Delft Campus 2030.

'What makes the TU Delft Campus different is the great diversity of field labs: real-life test locations where companies and knowledge institutions cooperate to develop, test, implement, and scale up new technologies for commercial applications'.
- www.tudelftcampus.nl/nl/samenwerken/.

Vision perspective for 2040

In 2040, the forms of cooperation on campus are more diverse than ever before. In 2040, in addition to cooperation with companies, intensive partnerships will have also developed between the University and municipalities (in particular Delft and Rotterdam) as well as relationships between the University and Universities of Applied Sciences, MBO institutions, and manufacturing companies on the Schieoevers. In 2040, the number of companies and their employees will have increased significantly.

In 2040, all users located on and around the campus will have become accustomed to sharing campus facilities, contributing to the maintenance of an active ecosystem. Such facilities include laboratories, meeting and teaching spaces, workspaces, and cafés and catering facilities.

In 2040, students, researchers, and innovative companies will be able to easily find each other in central places on the campus. The public space will show what is happening in terms of innovative developments. Experiments are visible in the form of field labs and prototypes.

The sharing of buildings makes cooperation easier than was previously the case. Buildings are used more efficiently by combining functions (also vertically).

Partnerships at various levels of scale, the "ecosystem" (I&IC).

The transition from 2023 to 2040

- The Universities of Applied Sciences become more effectively integrated. In the near future, MBO (Senior secondary vocational education) institutions and the manufacturing industry will also be regularly consulted and involved. This ensures that the campus is an ecosystem for all forms of technology, in theory as well as practice: an ecosystem ranging from high-tech to low-tech. After all, it is difficult to predict where the biggest challenges will lie in 2040.

Students at work (studio ROTOR, 2019)

- Spatial relationships are developed at various levels; multifunctional buildings serve several user groups, and the meeting rooms are available to various users on and around the campus. Smart forms of mobility connect the various areas of the campus, the campus is much more easily accessible to pedestrian traffic, and an efficient and easily accessible link is developed between the campus and both train stations. The development of the campus is closely coordinated with the development of the Schieoevers (spatially and functionally), whereby the Rotterdamse Road is an important part of this puzzle.

REPEAT, circular Head Phones, startup by former students at Industrial Design (Repeat Audio).

3.5 Campus = adaptive

Prepared for an (un)predictable future

'On-campus activities lead to more exchange and, at the same time, new forms of digital teaching will arise. The focus will be on significant and productive activities. To ensure that this development is sustainable and affordable, the campus must be flexible and adaptive."
- Arup, 2018.

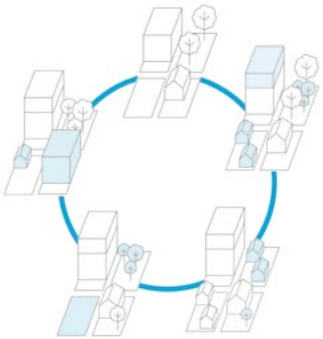
Vision perspective for 2040

The history of TU Delft shows that growth and functionality are difficult to predict. 100 years ago, the mining engineering degree programme was an important cornerstone of TU Delft. In 2040, the intake of Dutch students will probably be lower, based on demographic developments. However, this may be counterbalanced by immigration to the Netherlands or population growth elsewhere in the world. In view of all the uncertainties, the level of growth (or even contraction) is difficult to predict in the long term.

This applies to a lesser degree for the built-up environment. The overall structure and the iconic buildings will still be in place in 2040, including the Aula Building and the buildings now being used by faculties such as 3ME, EEMCS, A+BE, AE, CEG and Applied Sciences. Construction is already being done differently, sustainably of course, as well as buildings that can be adapted to different functions, can be taken apart, and/or are temporary and always circular. The sustainable TU Delft Campus of 2040 is designed to be able to adapt to change. Over time, buildings used for teaching purposes as well as (some) research buildings can be assigned new functions and may end up becoming residential buildings The complexity and dynamic nature of the campus in 2040 is made clear in the TU Delft Campus Digital Twin (a digital replica for purposes of monitoring as well as testing and simulation).

In 2040, the TU Delft Campus is an example of recycling (of materials and entire buildings), on the one hand, as well as a showcase of various smaller-scale and temporary solutions. The adaptability of buildings makes it easier to stack various functions and, by doing so, to make maximum use of the existing footprint. The adaptive campus is a sustainable campus in which buildings and the outdoor space are prepared for extreme weather conditions. A climate-sustainable campus must therefore also include the water system and the vegetation.

In 2040, the mobility solutions and infrastructure are flexible as well as safe and reliable.



The campus is continually changing.

The transition from 2023 to 2040

- In order to meet the demand for more space for teaching, research, valorisation, and innovation as well as for businesses, housing, and relevant facilities, the campus will always have to be prepared for change. At the same time, in order to be able to create high-quality public space, Campus Midden, in particular, can be made more dense via the addition of (medium) high-rise buildings (potentially on top of existing buildings). Building more compactly will be the new trend aimed at maintaining the public space and ensuring that these spaces can adapt to climate change and also include green areas for relaxation and study (Vision on visual quality of public space, 2014).
- Growth also implies that the TU Delft Campus retains what it has in terms of quality, as this comprises the history of TU Delft and our heritage. Preservation and recycling is also an important message of sustainability to the outside world. This allows us to avoid changing the footprint of the campus at the cost of its surroundings.

Designed to be able to change:

- Strategic gaps exist and urban flexibility is needed to facilitate changes in the near term.
- Temporary buildings are needed to be able to meet current demands. Temporary buildings can, after all, avoid lengthy design and development procedures. This applies to various campus functions, including teaching, start-ups, and catering and housing for students and young researchers at the University and companies.
- The buildings and layout of the public space are designed in a circular manner to avoid material wastage. The buildings and design of the public space will have a ‘materials passport’ in order to take into account the recycling of materials in case of dismantlement.

Climate change and biodiversity:

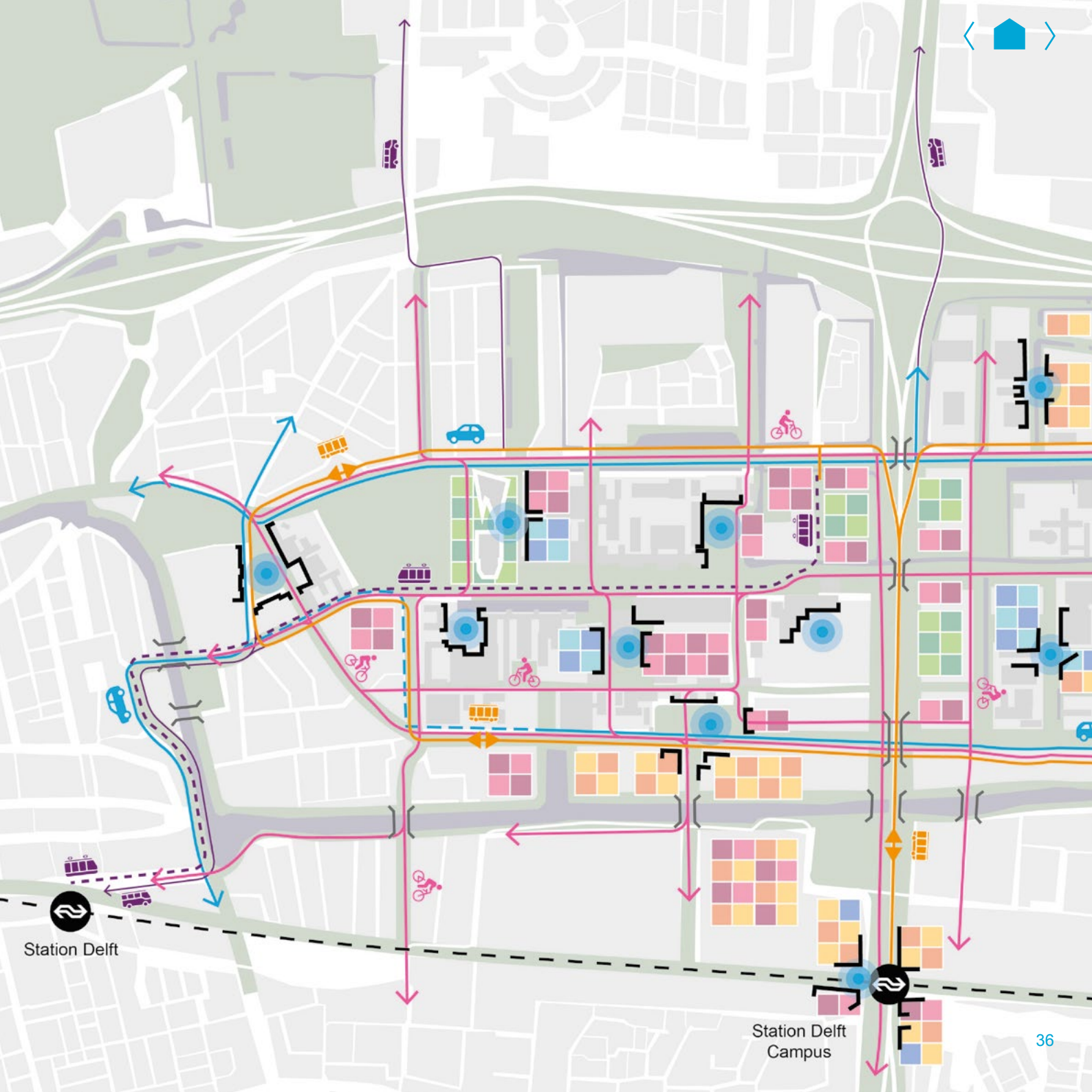
- Climate mitigation and adaptation are always the guiding principle behind the mix of recycling and the use of adaptable and flexible construction.
- The TU Delft Campus will not only be more of a ‘city’. It is also a landscape where, from now on, the focus will be on fewer paved surfaces and a better water absorption and microclimate (preventing heat stress). An integrated landscape plan is needed for that purpose, in which the green areas (e.g. effective tree plan) are designed to be integrated with the buildings (green façades and roofs).
- The interaction with the surrounding ecological network is also improved in order to ensure and optimise biodiversity. The design of the public space and buildings also takes nature into account.

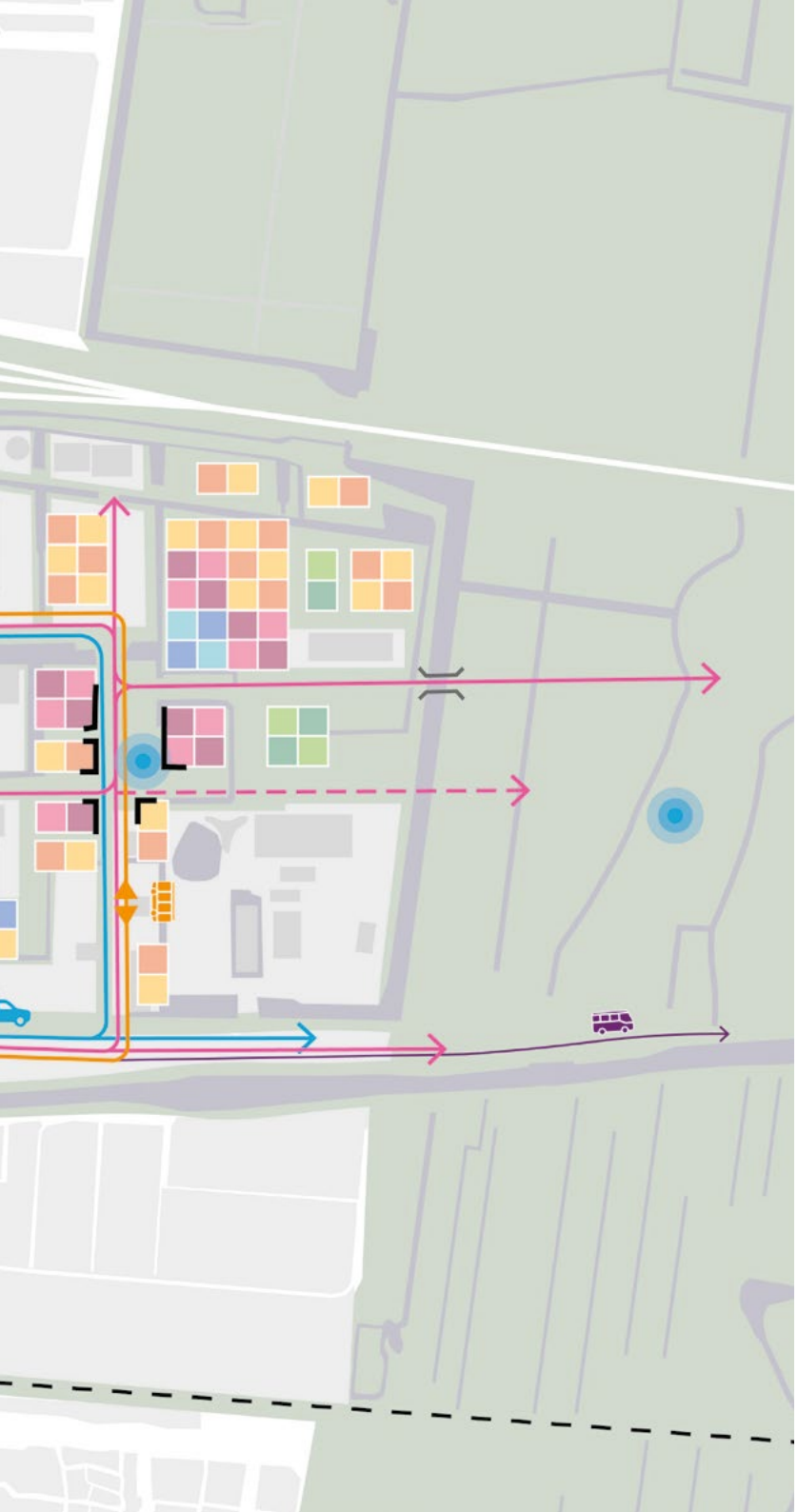
4. Spatial visualization

The five perspectives have implications for the spatial development of the TU Delft Campus in 2040. Several possible consequences of the vision are illustrated in the spatial visualization. In the first place, the spatial development is visualised in a vision map for 2040. This map presents the primary changes in relation to the new functionalities and changes in mobility.

After a description of the TU Delft Campus and how it is accessed (mobility and accessibility), a description follows of Campus North, Campus Midden, and Campus South. Arguments are then presented in favour of Mekel Park 2.0, a specific local vision in which the Midden and South campuses are closely connected to each other via an extended Mekel Park.

These descriptions illustrate how the vision can be made more concrete and are intended primarily as a source of inspiration and discussion.


Station Delft
Station Delft Campus



TU Delft Campus Vision map,

possible elaboration of the 2040 Campus Vision.

Housing & Amenities

Sport & Recreation

Teaching & Research

Businesses & Innovation

Cluster

Cycle path

Bicycle > 2040

Motorway

Cars are guests

AV (Automated Vehicle) and public transport bus

Tram

Public transport bus service

0 50 100 250 500 m

N

4.1 The TU Delft Campus - is urbanising

The TU Delft Campus consists of vibrant clusters. The centre consists of a typical university campus, where large university buildings and densely populated outdoor areas dominate the ‘look and feel’ of the space.

The neighbourhoods surrounding the central area are of a mixed character. These neighbourhoods contain facilities that can also serve campus users and vice versa: the grounds of TU Delft also contain facilities available to all residents of Delft. A relatively large part of the residents (but definitely not all residents) of the campus are connected in one way or other with one of the knowledge institutions or companies, either as an employee or as a student. The campus is the recognisable homebase of a sustainable university of technology but is at the same time a ‘mixed campus’ where neighbouring residents, employees of businesses, and students at Universities of Applied Sciences and MBO educational institutions as well as visitors from all over the world feel at home.

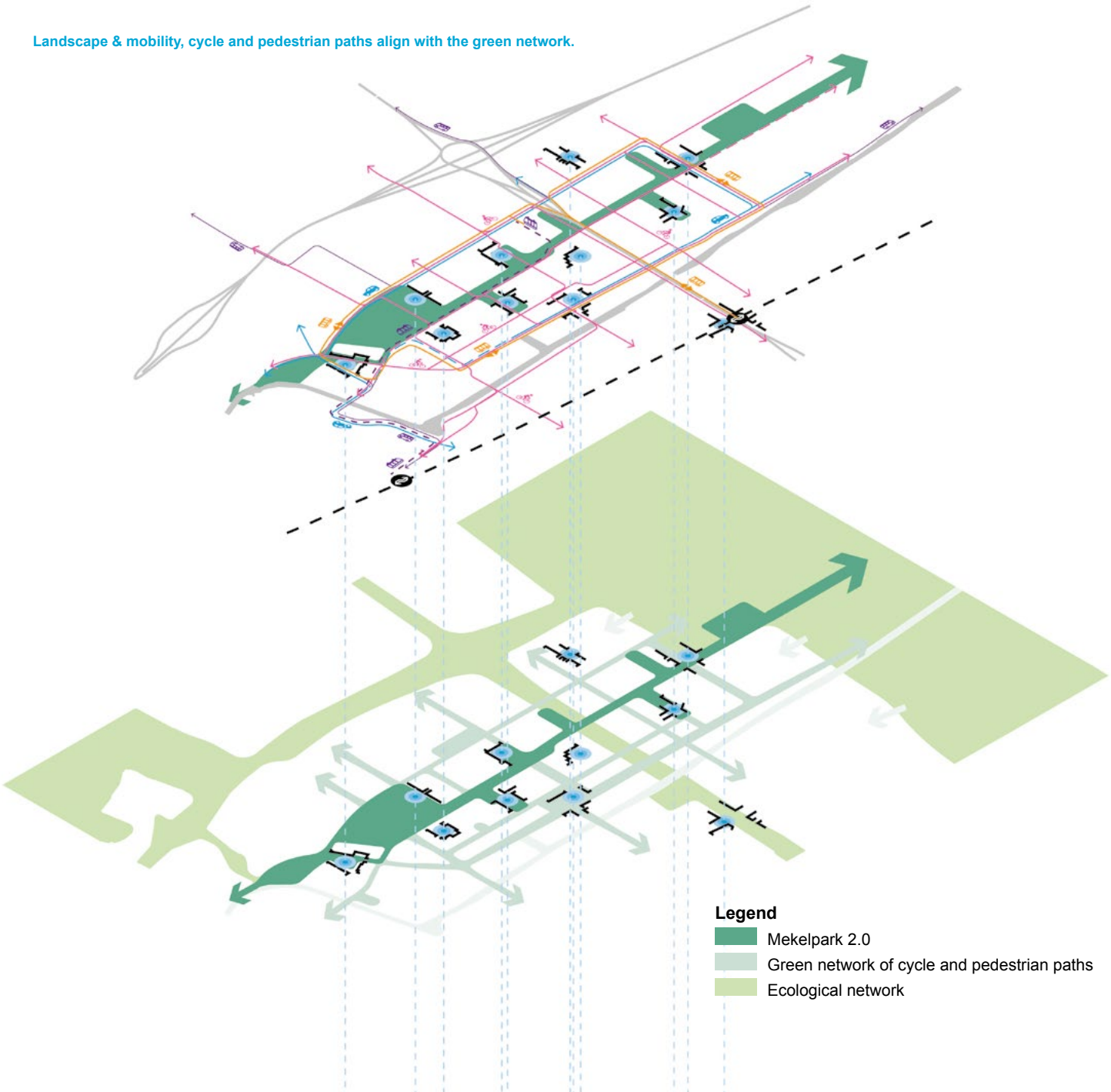
Functionally, the Schieoevers and the campus grounds form an integrated entity. Facilities and parking spaces as well as public green areas are shared. By way of illustration: as an important cultural and historical monument, the Hammen Farm will serve the public (e.g. restaurant, catering). In addition, the farm garden will serve as a public (nature-oriented) playground as well as a pocket park for the residents of the Schieoevers.

A cluster of cultural facilities surrounding Lijm en Cultuur will be developed near the Gelatinebrug (bridge) over the Schie.

Cluster near the new Gelatinebrug; from the Hammenboerderij, the Rotterdamseweg is a bicycle route where cars are guests.

Housing is essential for making a ‘city’. In order to really improve the situation, several thousand residential units can be built on the grounds owned by TU Delft, divided over several residential clusters. It goes without saying that this must be done in line with the building guidelines of the municipality. This will generate sufficient ‘critical mass’ for facilities such as café’s, restaurants, and catering facilities situated near to the residents. The development of housing ‘clusters’ will also prevent any nuisance for residents caused by laboratories.

Landscape & mobility, cycle and pedestrian paths align with the green network.



Landscape plan and design of the public space

A landscape plan (see Mekel Park 2.0) as a blueprint for the TU Delft Campus emphasises the green public space as a unifying theme. The landscape gives the campus its own identity and serves to connect the various buildings on the campus.

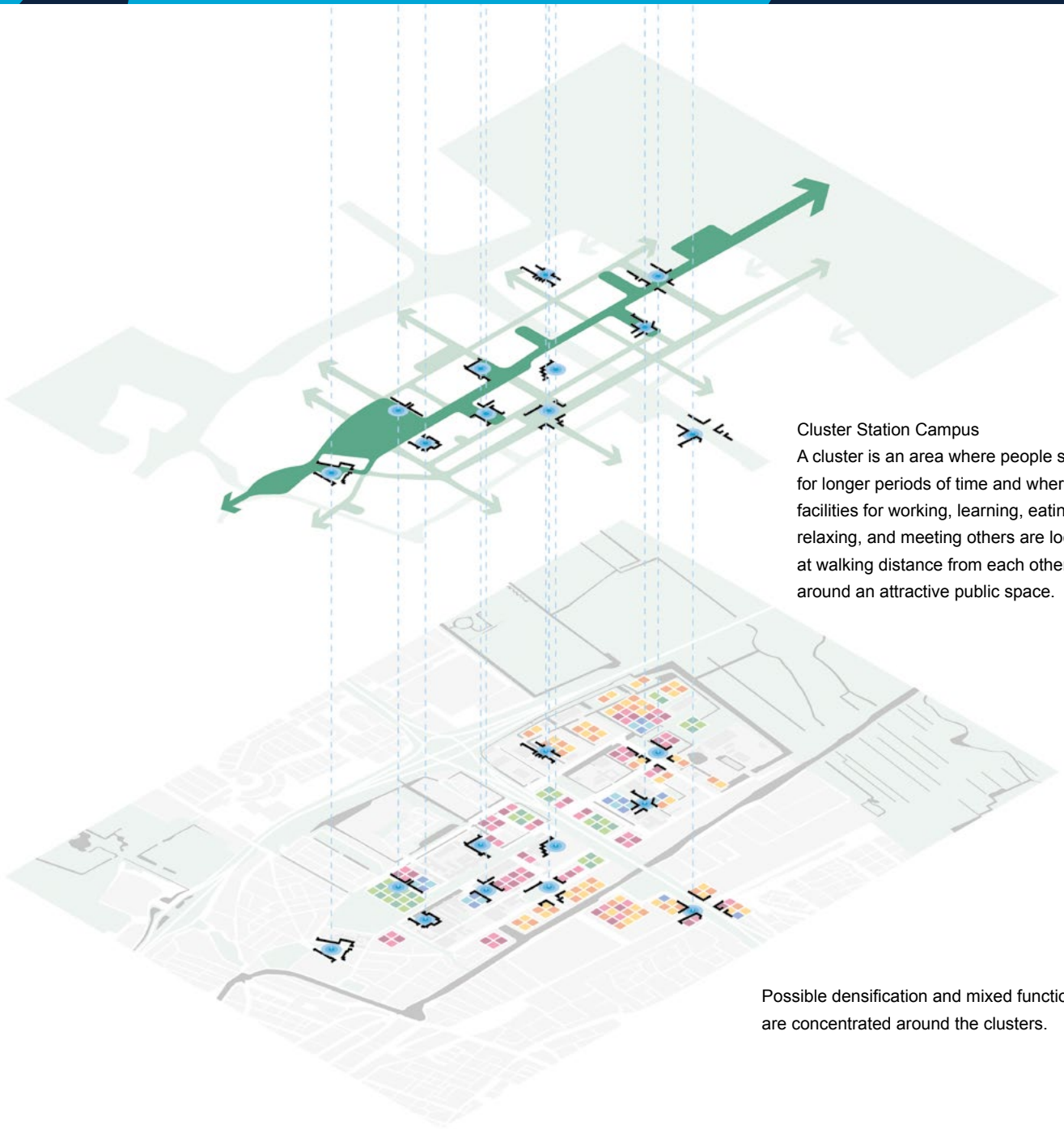
This landscape plan links the campus to the surrounding areas. A green area links Campus South in the direction of the Ackerdijkse Bos. The De Vries Van Heijstplantsoen in the middle of Campus North is connected to the Schie via the Botanical Garden. The green and socially attractive area around the Aula Building and Library is enlarged and connected to the existing Mekel Park. The Mekel Park is connected to the Kluyverpark via an access route running under or over the Kruithuisweg. This connects Campus Midden and Campus South and also minimises the role of the Kruithuisweg as a barrier.

Every landscape plan for the campus will definitely take the main ecological structure into account, including the Kruithuisweg and the Rotterdamseweg. The area of paved surfaces will be drastically reduced, for example by eliminating parking areas and realising a green tram track. The biodiversity can be greatly improved. The green-blue landscape helps to reduce heat stress and increase biodiversity. The solutions for water retention, such as half-paved surfaces, larger surface water bodies, and green façades & roofs, are applied to the public areas of the campus and are also part of the campus's role as a living lab. The number of trees can be drastically increased. New and existing interventions in the built-up environment for adapting to climate change are also applied and tested for optimum effectiveness. The Campus is a living lab where the application and effectiveness of innovations can be evaluated.

Clusters

More 'clusters' are added to the campus. Following the example of the successful IDE-cluster (see 3.4), clusters will be developed around a park behind EEMCS, at the end of the Mekel Park in South, and at the Delft Campus station. The cluster near the Hammenboerderij, together with the new Gelatine bicycle bridge over the Schie and the public square for Lijm & Cultuur, creates a full-fledged and representative entranceway to the campus. This cluster is located partly outside the grounds owned by the University and will be developed in collaboration with the Municipality of Delft.

The Faculty of IDE consists of Pulse, the IDE Café, the Teaching lab, and Coffee & Bikes, all located around a small-scale green public space; cyclists can park their bikes close to the entrance.



Cluster Station Campus
A cluster is an area where people stay for longer periods of time and where facilities for working, learning, eating, relaxing, and meeting others are located at walking distance from each other around an attractive public space.

Possible densification and mixed functionality are concentrated around the clusters.

4.2 Mobility and accessibility

Every development regarding the mobility and accessibility of the campus is a challenge that needs to be tackled together with the municipality of Delft, the Metropolitan region of Rotterdam and the Hague (MRDH), and the province. The proposals in this vision are therefore also intended to serve as a source of inspiration and debate with all the actors concerned.

At present, access to the campus is provided via a ring road, formed by the Schoemakerstraat, the Huismansingel, the Heertjeslaan, the Rotterdamseweg, the Jaffalaan, and the Zuidplantsoen. This internally directed mode of access is no longer appropriate. A transition is necessary to a network of access roads that serve and connect both sides of the equation. This will result in a connecting road between the campus grounds and the Schieoevers (Rotterdamseweg), on the one hand, and a connecting road between the campus grounds and the Schoemaker Plantage (Schoemaker Straat) on the other. In addition, this will make the campus more accessible towards the Delft city centre. The downgrading of the Kruithuisweg, i.e. the N470, nearby the campus (from 100 to 50 km/h in 2040) provides three benefits: 1. The change in noise/nuisance profiles will make it possible to build closer to the road; 2. The green zone bordering the road becomes an attractive recreational route for walking and cycling; 3. With a modified profile, the Kruithuisweg will also provide space for a public transport link between the TU Delft Campus and the Delft Campus station.

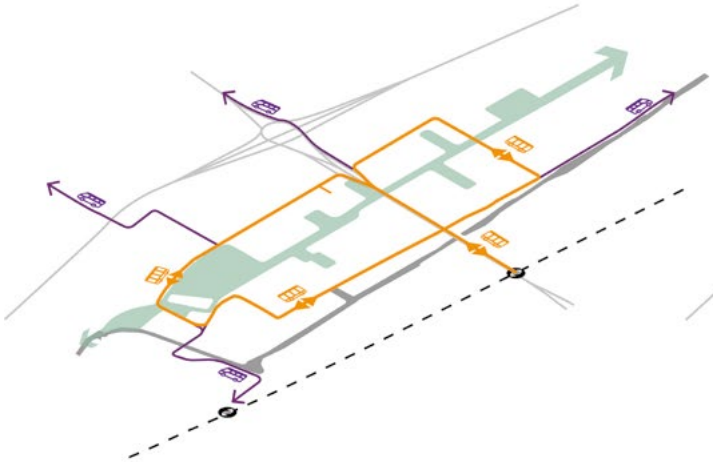
The speed limit on and around the campus will be 30 km/h. The Kruithuisweg will provide access to the campus from the motorway as well as from the Delft Campus station.

There are two potential scenarios in transitioning towards 2040: a) designing the road as a flyover for the three North-South routes in order to create a continuous landscape.

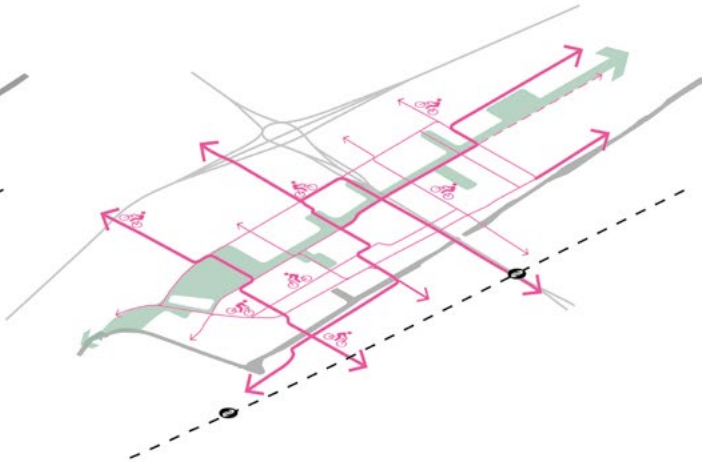
The addition of the programme for a route on and under the Kruithuisweg creates an attractive and socially safe link between Campus Midden and Campus South.

The open space under the Kruithuisweg can be used for various functions (Antwerpen, AG Vespa).

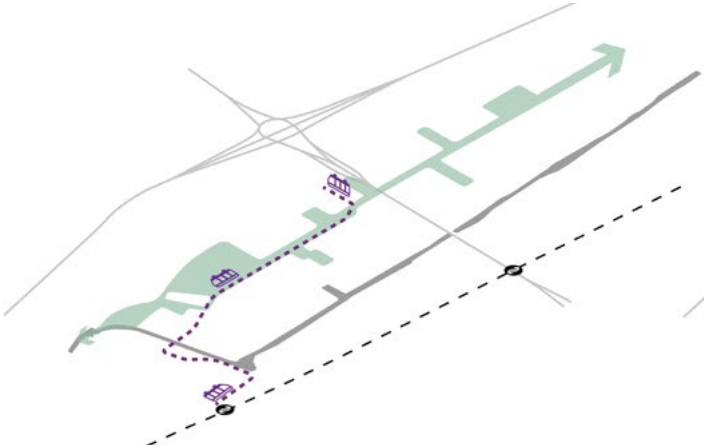
b) lowering the Kruithuisweg to ground level in the middle of the campus and building a land tunnel for it. Within this context, the Mekel Park can serve to connect the Midden and South campuses over the Kruithuisweg.



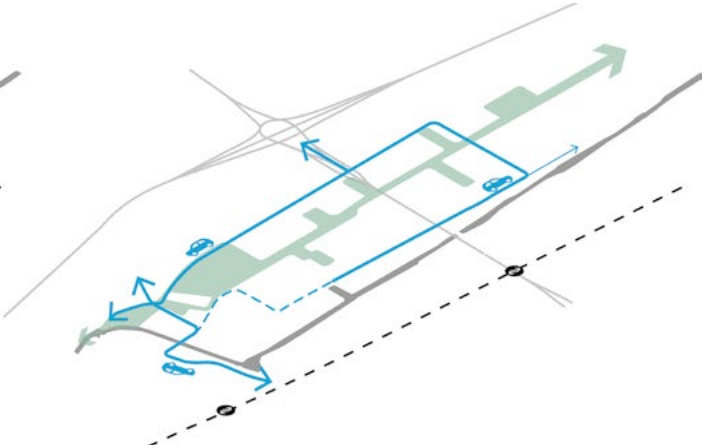
Bus lines and Automated Vehicles for campus users as well as for companies and residents in the vicinity. Connecting both stations with each other makes the campus more accessible.



Cycle paths and routes connect to the urban cycle route network. The campus is dotted with a dense network of cycle paths and bicycle parking spaces.



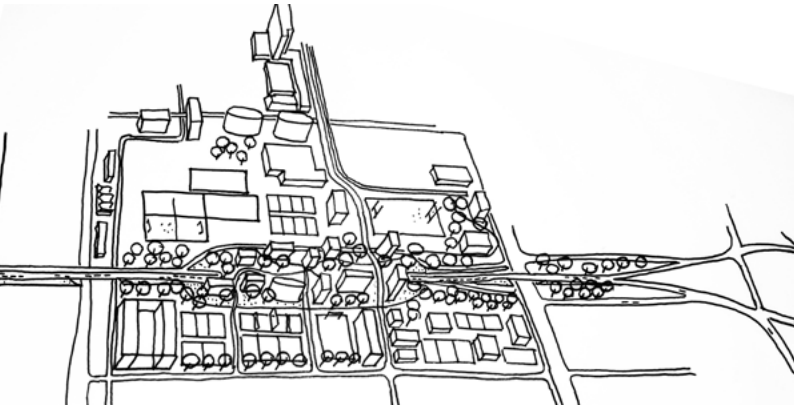
In 2024, a turning point will be installed for the tram at the Kruithuisweg. As things stand now, this will also be the final stop. However, the tram route on Campus Midden is part of a larger study that, depending upon the conclusions, can lead to extending the route southwards.



Access roads for car traffic: accessible for residents but limited for campus visitors.
Bus, AV (automated vehicle) shuttle, bicycle, or electric scooter take care of the ‘last mile’.

Explorations: mobility and accessibility.

In both scenarios, it's possible to build closer to, beneath, or on the Kruithuisweg in combination with a park landscape. This makes the link between Campus Midden and Campus South more attractive and socially safer.



Variant b: the Kruithuisweg in a land tunnel.

Public transport

Due to its large transport capacity, the tram is important for providing access to the campus. The tram rides over the central axis through the Mekel Park, ideally through a 'green track'. In 2024, the tram will turn around before the Kruithuisweg. As far as is now known, this will also be the final stop. The extent to which the vibrations and electromagnetic field of the tram impact the innovative tram route on Campus Midden will then form the subject of a longitudinal research effort. After 2030, the conclusions from this research may or may not result in a follow-up route leading southwards.

In future, the buses will ride via the Schoemakerstraat and the Rotterdamseweg. The fact that the bus and tram follow different routes allows for making the Mekel Park significantly greener and providing better access to the surrounding neighbourhoods via public transport. This has a positive impact on the attractiveness of the Mekel Park as a place to spend quality time in and walk through.

A green tram track in the Mekelpark takes care of integration into the landscape as well as capturing rainwater (Rotterdam).

Automated vehicle Mcity, University of Michigan (US).

A bus or automated vehicle shuttles between the Delft Campus station and the campus itself. This provides a solid link between the campus and the Delft Campus station on the one hand as well as the Delft train station on the other, which in turn distributes that traffic flows more efficiently. During rush hour, the peak loads on the various routes will be reduced and the accessibility of all the surrounding neighbourhoods will be improved.

Traffic hubs are more than just parking structures. They are transfer locations that also have other functions such as logistics, cafés and restaurants or recreation, as illustrated by this example with sports fields on the roof (Copenhagen, JAJA architects).

By car

Cars will disappear from the street scene and be phased out in the last mile. Parking will be available in one of the traffic hubs along the ring road. The parking facilities will be shared by the University, residents, and businesses. The Christiaan Huygensweg can become car-free and therefore part of the overall green space. The 'last mile' from these hubs can be traversed on foot or using any of the various sustainable shared forms of mobility such as Automated Vehicles, bicycles, or scooters. This has an effect on the design of the roads and creates a feeling of openness.

Bicycle

In future, the intensity of bicycle traffic will increase due to the growth in the number of users as well as the preference for more sustainable modes of transport. Fast bicycle traffic moves via the Schoemakerstraat and the Rotterdamseweg, which is part of a metropolitan bicycle route between the Hague, Delft, and Rotterdam. Slower bicycle traffic uses the North-South parallel routes provided by the Mekel Park or the Leeghwaterstraat. The Leeghwaterstraat is a bicycle route that serves as a "splint" for the Rotterdamseweg via the widened tunnel beneath the Kruithuisweg, continuing onwards until Campus South and also accessible from the north side via the Gele-Scheikunde grounds. Along the East-West axis, the routes connecting the neighbourhoods adjoining the campus are strengthened by two bicycle bridges: the Gelatinebrug and the Energiebrug. Bicycles can be parked in dedicated bicycle parking spots in buildings, in Coffee&Bikes facilities (offering bicycle rental and repair) or near the entrances to the classroom buildings and other central facilities.

Walking

Pedestrians are an integral part of the campus scene. They can very easily meet with other pedestrians and can also easily go from being a passer-by to someone who decides to stay in one place for a while. Walking on the campus can be functional or recreational. Walking routes are combined with ecological connections and art-focused routes. The distribution of bicycle traffic and the rerouting of the bus improve the quality of walking on the campus.

Accessibility

Making the campus more easily accessible to slower forms of traffic in combination with high-quality public transport improves campus accessibility. In addition, it's important to ensure that the public space is safe, during the daytime as well as evenings and weekends. The accessibility of buildings is prioritised, with pedestrians being able to cross through buildings and cyclists having access to sufficient parking facilities near their final destination. The Delft Campus station becomes a full-fledged public transport link. To make the Delft Campus station even more attractive to users of public transport and bicyclists, the level of facilities available at the station will be upgraded with more bicycle parking spaces, accommodation facilities, and bicycle rental options for commuters.

4.3 Campus North

Characteristics

Campus North is an area with a valuable cultural and historical character, whereby the public space is encircled by striking brick architecture such as the De Vries van Heijstplantsoen (park). It provides a gradual transition between the Delft city centre and the campus, and between the residential neighbourhoods of Wippolder-East and Zeehelden and Campus Midden. With a mix of teaching activities, businesses, housing, and various facilities (such as the Botanical Garden), Campus North is a lively place to be seven days a week from early in the morning until late at night.

Within the campus communities, Campus North, with its mix of green spaces, student housing, university facilities, commercial activity, and a rich heritage, is seen as a leading example of an attractive campus. The pre-war buildings, such as Kanaalweg 4 (with the former Delft Observatory), the new head office of Royal Haskoning DHV, and the Faculty of Architecture and the Built Environment, are prime examples of sustainable historic architecture.

Programmatic implementation

The Michiel de Ruyterweg is a city street that connects the centre of Delft with the Mekel Park. The installation of better outdoor lighting in combination with a more lively plinth in the new buildings on the Gele Scheikunde grounds will make the route from the city centre to Campus Midden socially safer. As an example of a more lively plinth, cultural activities accessible to the public can be situated in the south-west wing of the building housing the Faculty of Architecture and the Built Environment on the Michiel de Ruyterweg, precisely along the axis of the Mekel Park.

Campus North is the historic entrance to the campus as well as a green link between the Wippolder and Zeeheldenbuurt neighbourhoods. Botanic Gardens: a heritage and meeting place.

Campus North provides a gradual transition between the Delft city centre and the rest of the campus, and between the residential neighbourhoods of Wippolder-East and Zeehelden and Campus Midden.

This part of the Michiel de Ruyterweg has restricted access for cars. The west façade of the Faculty of Architecture and the Built Environment is also made more accessible and attractive, for example by adding catering facilities and laboratories that are visible from the street.

As a space for exhibitions, research, and meetings, the Botanical Garden is the TU Delft's visiting card for a broad group of users. The Botanical Garden will also have an entrance on the Kanaalweg in order to improve access to and from the city.

Public space

The De Vries van Heijstplantsoen (park), the Botanical Garden, and the small adjacent polder form a continuous green area connecting the campus to the canal. The trees in the climate arboretum connect the De Vries van Heijstplantsoen to the green space around the Jaffa Cemetery.

4.4 Campus Midden

Characteristics

The recognisability of the central axis, the Mekel Park, is one of the campus's qualities in 2040. Campus Midden is a link in the North-South as well as East-West direction and has a dense programme of activities. The stacking of various functions, the elimination of parking lots, and the strengthening of quality public space allows for creating an even higher density. Housing, teaching, research, office space, and commercial activity can be combined vertically as well as horizontally, whereby a lively plinth is always the point of departure.

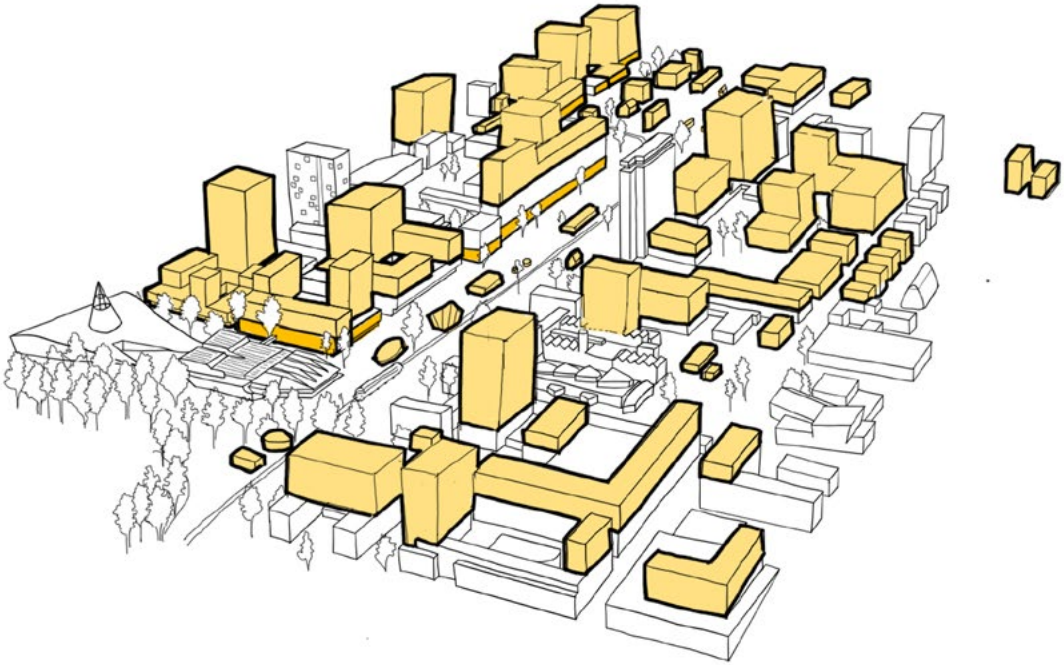
A lively plinth can contain catering facilities (ranging from a coffee corner to a hotel) or shops, or it can serve a broader public in other ways or provide a visual display of commercial activity (from the University or entrepreneurs).

The campus will have a "lobby", i.e. a place for welcoming guests. One of the renovated wings of building 22 houses the EB and, together with the Aula Building and the Library, also serves as the TU Delft's visiting card.

Stacking functions: housing on top of educational facilities Ryerson University, Health Sciences Complex Toronto (Perkins&Will).

This strengthens the multi-functionality of the buildings, an important principle of an accessible campus.

Building 22, south of the Aula Building and Library, offers a great many opportunities. This central location can serve as a reception centre for welcoming visitors and providing other services to the public. Additional floors can also be added to provide extra functionality (such as housing).



Densification of Campus Midden.

Impression of the densification of Campus Midden with transparent façades and meeting places.

Public space

The challenges consist of adapting the buildings of the CEG and EEMCS faculties for activities suitable to the smaller-scale needs of the community on Campus Midden. The lecture halls of the CEG faculty, with its feet on the ground floor, form a barrier that needs to be overcome in order to make the building more accessible and more involved in ground-level activities.

Efficient use of the space via programming and stacking. A space for a shop, for a café/restaurant with terrace, for skaters and for basketball. (Basketbar, NL Architects, Universiteit Utrecht, Architects).

Multifunctional use of the public space as a water buffer and a lively spot for sports (Waterplein, de Urbanisten, Rotterdam).

The addition of pavilions for the EEMCS faculty could provide a solution for the absence of low-rise buildings and also reduce the wind nuisance at ground level around the high-rise buildings. In addition, opening up the exterior walls of the low-rise buildings offers opportunities for providing more public services

Various sports facilities, including several rugby pitches, are located on Campus Midden. Relocating one of these pitches and modifying the layout of the other facilities should make it possible to realise a better connection between Campus Midden and Campus South.

In addition, sports facilities will be more effectively integrated into the park landscape of Campus Midden. This can be realised by the addition of small-scale and user-friendly public sports facilities (ranging from Cruyff Courts to fitness equipment) as well as a running and walking circuit over the entire campus.

The Science Centre square is an experimental place and showcase for innovative commercial activities. All these public assets are linked together by the extended Mekel Park: starting from the Aula Building and Library and continuing under the Kruithuisweg to the Kluyver area in Campus South. The end result is an East-West axis with housing, sports facilities, and space for experiments extending from the Science Centre and X via Balpol and the Hammenboerderij all the way to the Schie. The range of functions and public space available emphasise the vibrant character and informality of this zone, which will attract students in particular seven days a week.

4.5 Campus South

Characteristics

On the one hand, Campus South is a high-tech campus, the place where innovative commercial activities and scientific research and teaching activities all come together. On the other hand, Campus South is a polder landscape where innovative water-retention solutions in combination with nature development is on display. As the lowest lying part of the campus, it is located on the edge of the city adjacent to the recreational Ackerdijkse Bos where the Art Centre is located. Campus South is subject to the greatest degree of uncertainty and is therefore a good location for flexible and temporary solutions.

The campus offers space for experimentation and informal use.

Nature development on Campus South, where Mekelpark 2.0 extends into the Ackerdijkse Bos.

Example of flexible use of space, temporary work spaces for start-ups (Startupvillage, Amsterdam).

Bicycles are prioritised over cars: bicycle parking spaces are integrated into the building or designed as complete facilities (Coffee & Bikes). This bicycle parking space in the Bio Science Park Leiden is an attractive addition to the area where people stay for longer periods of time (Leiden, West 8).

Programmatic implementation

The area around the Kluyverpark on Campus South in particular is being used by the University for research and teaching. Within that context, the Kluyverpark is an important cluster for people to meet each other and become acquainted with all the commercial activities in the vicinity. In 2023, a cluster of temporary functions, such as the Firma van Buiten, is located along the Thijsseweg. This can also serve to provide access to the lowest lying part of the campus: The ‘Blue Village’ - a watery fieldLab with innovative methods of building (for businesses and residential units) in and around the water.

Circular construction with a focus on integration into the landscape (Triodos Bank, RAU architecten).

A vibrant University Village (with residences and facilities) with proximity to water could be created at the end of the Mekelweg.

Student housing is located along the Mekel Park (preferably visible as a landmark from Campus Midden), and the park makes the Ackerdijkse Bos accessible to users of the campus and all Delft residents. Housing and facilities for a minimum of 2000 new residents (students, temporary and permanent employees of the University and businesses) will be developed around this area and the temporary buildings.

Sustainable, temporary, and adaptable are all important aspects, also for the development of commercial enterprises. As is the case in Campus Midden, stacking is also an option here, and a lively plinth is a precondition for every development.

Public space

In terms of landscape, Campus South is connected to the adjoining green rural areas. The peatlands in the most south-eastern part offer quite special landscape planning opportunities. Due to the longer development trajectory, social safety is a priority particularly in Campus South. In that regard, the presence of public transport is a precondition for any and all developments. This will also make it possible to limit the number of parking places available.

4.6 Mekel Park 2.0

'In terms of treetop cover, Campus Midden and Campus South, with respectively 26% and 18%, score (far) below the so-called 3-30-300 rule of thumb (3 trees visible, 30% treetop cover per neighbourhood, and green areas accessible within a distance of 300 m)'
- René van der Velde (TU Delft, UHD Urban Forestry).

The connection and identity of the campus is shaped by Mekel Park 2.0. Mekel Park 2.0 extends from the Library until the Ackerdijkse Bos and integrates the campus into a single entity. A Campus is by definition a landscape that contains buildings and/or functions. Campus Midden can comply with this description by ensuring that the Mekel Park extends into the side streets. This can be done in the Christiaan Huygensweg and the Van der Waalsweg (the Aula Building will then be located in the park), the Cornelis Drebbelweg (up until a small park beneath the trees behind the EEMCS), the Stieltjesweg (walking to café's and restaurants), the Berlageweg (to the Science Centre), the B. van der Polweg (to a University village), and the Kruithuispad. After that, the park continues on to Campus South and connects to the Watermanweg and the Kluyverpark. The park then continues further until it meets the Ackerdijkse Bos. After the necessary modifications are made to the CEG building, the park can also connect to the Echo building used for teaching purposes.

As many adjacent buildings as possible will be included in the park. The Mekel Park is car- and bus-free, and the only motorised vehicle on Campus Midden is the tram. The Mekel Park serves the users and residents of the campus and in future can relieve some of the pressure on the city centre via the addition of housing for student associations.

In 2040, the Kruithuisweg will no longer be a barrier, and Campus Midden and Campus South will be connected to each other in a transparent and socially safe manner. The Mekel Park will be a dominant factor as soon as the Kruithuisweg is scaled down and converted into a flyover above the park or the Mekel Park passes over the Kruithuisweg, which in that case passes through a tunnel.

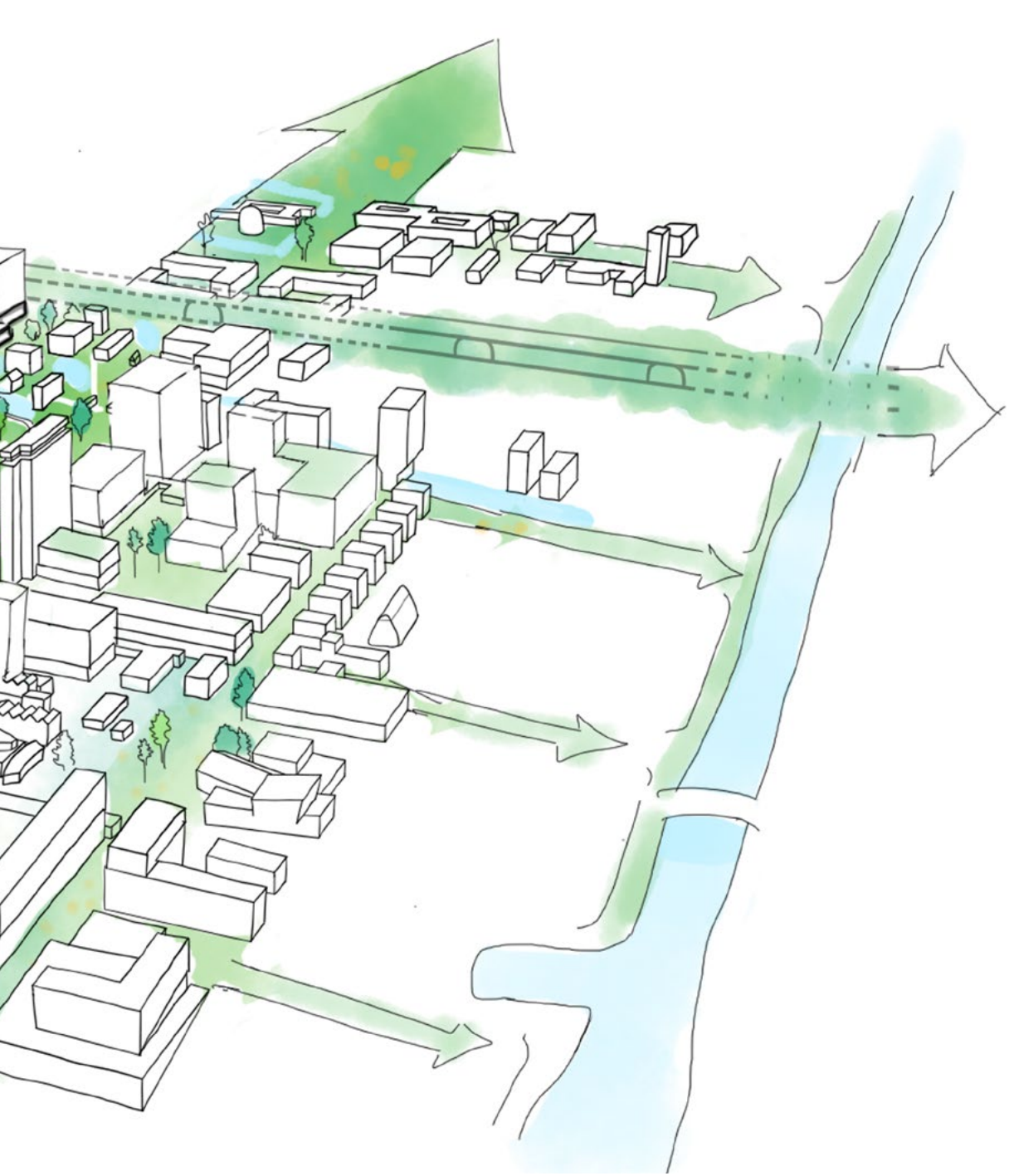
Quality public space for sport and recreation (Taylor Brammer Landscape Architects).

Mekelpark 2.0 located in the Kluyver area (Campus South).

In this scenario, the speed limit on the Kruithuisweg is reduced to 50 km/h, which makes it possible to build closer to (or under) the road. In addition, it then becomes possible to create enough space on the road for public transport towards the Delft Campus station (preferably with automated vehicles).

The structural addition of more trees creates an area where it is enjoyable to linger for a while. The tree canopy also reduces heat stress (Radboud University, Nijmegen).

Mekelpark 2.0: from the Botanical Garden extending into Midden-Delfland.



5. Follow-up steps

The vision takes a continually changing context into account: what do we have to do today in order to facilitate the users of TU Delft Campus in 2040? On the one hand, this requires working out the details in smaller-scale visions focused on specific subjects (with a perspective of 5-10 years) and on the other a (financial) plan that connects to the campus strategy.

Campus communities remain involved

The people make the campus, and the campus has an impact on the people. Regular meetings with the people concerned about specific topics (such as the 2022 campus workshops) and updating the campus vision every five years ensures support and involvement. Clearly communicating about interventions and related timelines (new housing on campus, action timelines). Establishing and staffing a contact centre about the campus for those concerned and for residents, separately or together with the municipality.

The University can cooperate as a partner with regard to the developments in the city and in particular around the campus. This involves the quality of life in Delft-West, coordinating programmes with the Schieoevers and the Delft Campus station, and nature development extending from the Botanical Garden to the Ackerdijkse Bos.

Implementing the campus vision

Developing a housing programme based on target groups and locations. This can be combined with temporary (rapid) solutions and potential reuse. A clear zoning plan that takes into account areas of nuisance caused by companies and traffic is a precondition for the above.

An integrated landscape plan including a reduction of paved outdoor surfaces, seating facilities, biodiversity, tree planning, walking routes and art routes Mekel Park development into Mekel Park 2.0 and a “green tramline”.

Eliminating cars from the street scene as much as possible. A very modest parking strategy together with public transport or automated transport links in combination with safe and easily accessible parking for (E-)bikes and a focus on new and slower forms of mobility.

Collaborating with the municipality and MRDH to explore the possibilities (and acceleration) of realising new bicycle routes, public transport routes, modifying the campus ring road, and ensuring that the Kruithuisweg no longer functions as a barrier.

In cooperation with the municipality, the possibilities for development of the Kruithuis zone are explored, including the sports facilities on the south side. The guideline here is the addition of buildings with an accessible plinth and a partial relocation of the sports programme if possible.

The elimination of historic buildings in order to build new ones elsewhere is not in line with a sustainable vision of the campus. Campus North provides a link between the University and the city (centre), and the pre-war heritage buildings strengthen our image as a university with history.

The (re)development of Building 22 (the present Applied Sciences faculty building) as a model project for the realisation of the first multifunctional building on the campus. The existing building can be taken here as the point of departure in combination with methods for adding layers (in wood) and partial demolition plus new construction.

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Workshop invitees

Housing Workshop 08-06-22

Workshop chair: Marja Elsinga (TU Delft, Professor of Housing Institutions and Governance)

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Workshop on Businesses, 13-06-22

Workshop chair: Rin-Sjoerd Zijlstra (TU Delft, Process manager for Campus Vision 2040)

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Directors of Education workshop, 10-06-22

The directors of education of the campus

Teaching Workshop, 06-07-22

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Campus Vision 2040 meeting, 03-10-22

Event chair: Wim Kooyman (Director Smart Workplace)

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Carlos Simao Ferreira (TU Delft, Wind Energy Science)
Cas Verhoeven (TU Delft, CREFM)
Caspar Chorus (TU Delft, IDE)
Cecile Calis (TU Delft, Architecture)
Chantal Brokerhof (TU Delft, 3 ME)
Charlotte van Hees (QuTech)
Chris Kleijn (TU Delft, Applied Sciences)
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Wolter Groenevelt (TU Delft, EEMSC)
Wouter de Haan (Deltares)
Wouter Nieuwstraten (Symeres)
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Yashasvi Aggarwal (TU Delft, Works Council support)
Young Mi Poppema (TU Delft, Policy & Implementation)
Zhao Fu (TU Delft, DEMO)

Workshop on Businesses, 21 November 2022

Alex Noordstrand (Fleet Cleaner)
Femke Kleiweg (Firma van Buiten)
Guido Sluijsman (NEXT Driver)
Ian Rooker (NMI)
Kevin (PATS)
Marc Schmidt (NMI)
Michel Borsboom (Netherlands Organisation for Applied Scientific Research)
Peter Karelse (VSL)
Roderik Colen (Delft IMP)
Steven de Bruin (Physee)
Timo Walvoort (Getinge)
Wouter de Haan (Deltares)

Overview of discussions

- Georg Vrachiolis – 3 October 2022
- Municipality of Delft - various discussions, in particular with Tako Postma and/or Judit Bax
- Raymond Brown and colleagues from X – 27 September 2022
- Kornelis Fragakis – 18 August 2022
- The research group on Environmental Technology and Design of Urbanism, A+BE – 21 October 2022
- Jules Schoonman – 23 August 2022
- Michael van der Meer – 16 September 2022
- Robert Winkel – 1 November 2022
- Residents of adjacent neighbourhoods – 18 October 2022 and 23 March 2023
- Schieoevers Business Association; Nils Eekhout, Jaap Langhout, Gilbert Bal – 13 December 2022
- ORAS – Rutger Blijleven 30 May 2022

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Colophon

1 May 2023

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