The sports hall Hjorthagshallen has been inaugurated.

Stormwater management in development phase Brofästet.

The Stockholm Royal Seaport Sustainability Report shows how this urban development project aims to achieve its sustainability goals based on the five strategies outlined in the steering document Sustainable Urban Development Programme, see QR code or link. The report provides an overall introduction to the project, followed by highlights of the year and details on various innovation projects. Subsequently, the year’s key events are presented by each strategic category.

The report also discusses how the strategies relate to Agenda 2030. This is followed by a description of working practices and collaboration processes. Thereafter performance is summarised by strategy. Please note that only performance in addition to statutory requirements are presented. Reporting is based on the Global Reporting Initiatives’ (GRI) Standard Core guidelines and is not externally reviewed. The sustainability report is also available as an extended web version which includes an interactive map that shows how requirements are met, an analysis of results, and details of other innovation projects. 

Link to pdf Sustainable Urban Development Programme (PDF)
Stockholm Royal Seaport
Winner of the 2019 Swedish Landscape Architecture Prize

“We have created climate-adapted and green spaces to increase wellbeing, biodiversity, and to manage stormwater effectively. The space between Jaktgatan and Lövängsgatan is a good example of how we work with multi-functional green structures,” says Gösta Olsson, who has worked as a landscape architect in Stockholm Royal Seaport for many years.

Photo: Lennart Johansson
Agenda 2030 consists of the 17 Sustainable Development Goals, (SDGs), that are to be achieved by 2030. The development of Stockholm Royal Seaport primarily involves SDG 11, Sustainable Cities and Communities, but also touches on all the other SDGs. On page 28, details are provided of how the SDGs are interpreted in local, project-specific contexts of Stockholm Royal Seaport.
Stockholm Royal Seaport is one of the largest urban development projects in Europe. When complete, about 12,000 new residential housing and 35,000 new workplaces will have been constructed. Planned completion is 2030.

13 detailed development plans have been approved.

5,410 residential apartments have been land allocated to 45 different developers. 3,008 apartments have been built.

6,600 residents have moved into the area.

8 preschools, an elementary school and a sports hall have been built.

The total development area covers 236 hectares.

Current status 2019

Development phases

<table>
<thead>
<tr>
<th>Area</th>
<th>Number of housing units</th>
<th>Commercial floor area m²</th>
<th>Construction start</th>
<th>Occupancy</th>
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<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Norra 1</td>
<td>670</td>
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<td>2011</td>
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<td>Västra</td>
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<td>2012</td>
<td>2014–2017</td>
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<td>2014</td>
<td>2016–2017</td>
</tr>
<tr>
<td>Brofästet</td>
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<td>2016</td>
<td>2018–2019</td>
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<td>Jackproppen</td>
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<td>125,000</td>
<td>2020</td>
<td>2023–2026</td>
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*Based on commercial floor area: the floor areas taken up by lobbies, enclosed machinery rooms on the roof, stairs and escalators, mechanical and electrical services, lifts, columns, toilet areas, ducts, and risers.
“Gasverket was opened in 2019, having been closed to the public for more than 120 years.”

In 2019, Stockholmers were at long last able to experience the first of the redeveloped areas of the Gasverket gasworks, including a school, (Bobergsskolan), Hjorthagshallen sports hall, Klätterverket, and other amenities. An important and encouraging milestone. 2019 has otherwise included continued planning for the development of Värtahamnen Port and Kolkajen. The closure of the Loudden site at the beginning of the year creates conditions to start the transformation – from a closed industrial area to an open urban environment.

In this report, we showcase examples of how Stockholm Royal Seaport is leading sustainable urban development in Sweden. The standards set by the City of Stockholm are often more ambitious than national guidelines, and thus drive the creation of key knowledge areas. If we are to meet Agenda 2030 targets, there is a need for projects that extend this progress and we need to share what we have learnt. The sustainability report is also available as an extended web version at stockholmroyalseaport2030.se.

As landowners, it is important that we establish clear requirements and ensure that these are followed up. This is also an obligation we have towards Stockholm City Council. Developers of properties that are now occupied have shown considerable commitment to meet our tough targets but have failed to meet energy requirements. Despite this, performance indicators for the Norra 2 phase of the project are on average 22 per cent better than National Board of Housing, Building and Planning building requirements (BBR).

Developers will continue to adapt their buildings to reduce energy use and at the same time acquire new knowledge. The fact that differences between recorded and projected values are large is a challenge for construction sector stakeholders and offers considerable potential for improvement.

We also see substantial willingness from residents to participate in public consultations and on social media.

Frihamnen marked its centenary in September alongside with Ports of Stockholm, property developers, and the City of Stockholm with temporary attractions and exhibitions that offered visitors the chance to feel, taste, and listen to the area’s potential. Many people now use the new ferry service that links Stockholm Royal Seaport with central Stockholm, and nearby municipalities of Nacka and Lidingö.

Planning for new sites with homes, retail, and office space is currently underway with some 30 developers. Several major projects have been started for the construction of tunnels and land remediation. The expansion of streets and parks is also ongoing.

Working with Stockholm Royal Seaport, we are proud of being involved in the transformation of former industrial areas into an attractive, safe, and resource-efficient new part of Stockholm.

Welcome to Stockholm Royal Seaport!

Staffan Lorentz
Head of Development,
Stockholm Royal Seaport
Stockholm City Development Administration
Highlights of 2019

A new era for Gasverket

In 2019, the Gasverket gasworks area was opened to the outside world after being a closed industrial area for more than 100 years. During the year, a new elementary school, (Bobergsskolan), and a new sports hall, (Hjorthagshallen), also opened, and several of the area’s old buildings welcomed new tenants. Stockholm’s highest climbing wall opened at Klätterverket in the old Måtarhuset and a Systembolaget store opened in Maskinhuset. It was also announced that global engineering group Sandvik and Bergh’s School of Communication are to relocate to the area.

Occupancy of plus-energy buildings

The two plus-energy buildings at Brofästet, with space for 43 dwellings, were completed and occupancy started during the year. Stockholmshem won the plus-energy building competition in 2014, in which one of the requirements was that the buildings should generate more energy than they consume during the course of a year. The two buildings combine architectural solutions with energy saving technologies. Read more on page 9.

Closure of industrial land provides space for 4,000 homes

The closure of the Loudden oil depot was completed and land remediation as well as the dismantling of the plant’s storage tanks has begun. The tanks are being cut into pieces and then folded to reduce noise pollution and the release of dust. In time, Loudden will provide Stockholm with 4,000 new homes and promises to be an attractive destination for residents and visitors.

Continued support for innovation projects related to source-separated wastewater systems

MACRO is an innovation project that continued to receive support form Vinnova during the year. The project, which has been running since 2015, helped ensure that Stockholm Vatten och Avfall was commissioned in 2020 to develop and test a source-separated wastewater system in Stockholm Royal Seaport. Read more on the following page>>

Photo: Kent Dahlberg
Photo: Shutterstock
A hub for innovation

Stockholm Royal Seaport is a testbed where new ideas, methods, and approaches are developed and tested to inspire other cities and municipalities, researchers, companies, and organisations to think in new ways. Here we present several innovation projects that trigger curiosity and interest.

Source-separated waste water system for Värtahamnen and Loudden

By dividing wastewater streams into separate systems in residential properties, resources such as water, energy and plant nutrients can be managed more efficiently. One of the world’s largest areas with a source-separated waste water system is now planned for the last phases of Stockholm Royal Seaport.

Two waste water sewers rather than one are planned in Värtahamnen and Loudden. The system will connect 6,000 apartments and 170,000 m² of commercial space once the area is built.

Heat, biogas and sewage sludge rich in phosphorus are already recovered at the Henriksdal wastewater treatment plant (WWTP). But by channelling and managing flows separately, resources in wastewater can be recycled to a greater degree. Apart from phosphorous, valuable nutrients such as nitrogen and potassium can also be recovered. In addition, more biogas can be produced.

“This project is extremely interesting and may lead to a paradigm shift in Stockholm’s development of waste water systems,” says Erik Karlsson, Director of Strategic Planning, Stockholm Vatten och Avfall.

Wastewater from baths, showers, and washing from households is currently treated at the Henriksdal WWTP. However, large amounts of heat is lost on the way there. If heat can be captured earlier in the system, heat recycling can be dramatically increased. By collecting household wastewater without mixing it with toilet water, it can be treated and used for a variety of purposes, for example irrigation. In this way, resources in wastewater can be reused more effectively.

Source-separated wastewater systems have been built and tested in a number of cities, including Hamburg and Amsterdam and such a system has been commissioned in Helsingborg in March 2020. The system planned for Värtahamnen and Loudden will be one of the world’s largest. The collection system for Värtahamnen will be planned in 2020 and 2021 and is scheduled to enter service in 2025.

Since 2011, the issue of extending source-separated waste water system has been reviewed in different projects. The MACRO project has been running since 2015 with financial backing from Vinnova.

The first phase focused on establishing a cross-silo collaborative projects. The other had the goal of reviewing the legal, technical, and organisational conditions needed to implement a source-separated waste water system in urban- and peri-urban areas.

Based on experiences from other projects such as in Helsingborg, the aim of the third phase is to conduct further studies into how a source-separated waste water system could be designed as well as produce the basis for planning the system in Stockholm Royal Seaport. This will then be documented in more general planning and design guidelines for cities.

The City of Stockholm is one of 10 partner organisations along with three municipalities, business, and academia. The budget for the third phase of MACRO is SEK 18.4 million and the project is expected to have considerable significance for the future of wastewater management in Stockholm.
Innovative energy solutions in plus-energy buildings

Stockholms hem (one of the municipal housing companies) built two plus-energy buildings in Stockholm Royal Seaport and tenants moved in during 2019. The two buildings, with 43 rental apartments are designed to be net producers of energy with the help of solar panels, geothermal heat, efficient insulation and ventilation, as well as recycling of excess heat from wastewater. Design features – such as balconies built into the facade and angled roofs to use the sun as an energy source – are unique. This project of engineering excellence innovatively combines some 20 new energy solutions.

Land allocation competitions are one of the innovation-driving tools used to achieve sustainability goals for Stockholm Royal Seaport. In 2014, a competition was held for the Brofästet phase with the specific aim of constructing plus-energy buildings with smart energy solutions and functional architecture. Of the 16 competing housing companies, Stockholms hem scored the highest number of points thanks to “a holistic approach for energy efficiency and good living environments with interesting and exciting architectural expression”.

Building energy-efficient multiple-dwelling buildings that also produce a large proportion of, or more than their energy requirement is a unique challenge. This is why it is important that experiences from this project can be shared to help others develop future projects.

External walls of the buildings are straight without bays or angles. The roof ridges of the buildings have been rotated to create straight south-facing roof areas, optimised to catch the sun’s rays. The roof angle of 30 degrees is within the optimal span for highly efficient solar panels with silicon technology.

The opposite side of the roof is covered in sedum to delay the path of stormwater to Husarviken via so-called raingardens – a shallow recess in the ground fitted with a drainage system and a filter material covered in foliage. Sun-facing gable facades are fitted with solar panels with a less shadow-sensitive thin film technology. North-facing gable facades are equipped with grid panels to encourage growth of climbing plants.

Space-efficient apartments have been an integral part of efforts to maximise the efficiency of internal heat loads. This has resulted in highly space-optimised two-, three-, and four-room apartments. Active heated living areas are minimised and complemented with unheated living spaces as glazed balconies along the longer facades of the building. This creates compact, well-functioning homes during the winter, with substantially increased space that is heated naturally in the summer. By using sun shades as blinds along the outside of balconies, heat can be released in the winter and stored in balconies’ concrete frames but reflected away in the summer.

Compact design, a tight building envelope, and the implementation of a raft of energy technology solutions have been key factors in ensuring that the plus-energy buildings achieve energy targets. Together with a wastewater heat exchanger and geothermal heating, the buildings become a functioning whole.

Optimised airflow, and thereby reduced volume of air to heat, makes it easier to use internal heat sources. Energy calculations show that the building uses around 14.8 kWh/m² per year, heating, building electricity and hotwater included. Energy produced by solar panels is calculated at around 16 kWh/m² per year. This means that over the course of a year, the building generates excess energy. Around 30 per cent of energy produced by solar panels can be used directly to meet the properties’ power needs for lighting, heat pumps, and fans.

Excess electricity production is sold to the grid and balanced against purchased electricity during colder periods. Over the course of the year, solar panels produce more energy than the properties need.
Quieter crushing
The “quieter crushing” research project, with the aim of reducing noise levels at crushing and material handling sites, has been running for the past two years. By soundproofing and enclosing crushing sites, it is possible to reduce noise levels and dust. The project is funded by a SEK 2.7 million grant from Vinnova.
Treating and reusing rock crushed locally considerably reduces traffic on the city’s road network. To date, approximately 600,000 tonnes of rock and spoil have been recovered in Stockholm Royal Seaport, which means that material recycling has saved around 100,000 roundtrips.

Innovative construction logistics
The Construction Consolidation Centre, (CCC), is currently located in the Värtahamnen port area of Stockholm Royal Seaport. The centre functions as an innovation hub that is home to large numbers of R&D projects that drive learning and development related to construction logistics issues. One of the projects conducted during the year was “Visualised construction traffic planning for effective urban development”. The project is supported by Vinnova and is led by Linköping University. The aim is to increase availability and mobility for all people in the city during the construction period and increase the productivity of the construction process. KTH is conducting three research projects under the auspices of the CCC with the overall aim of studying the level of co-operation between different developers and entrepreneurs at various stages of the project in terms of logistics operations and opportunities.

Reflow Stockholm
The Reflow Stockholm project identified the resources needed to build and manage a city. It was a deepening of Stockholm Royal Seaport’s circularity model and sought to identify the city’s flow of resources. The project was funded by Sweden’s Environmental Protection Agency and was completed in 2019.

The future of energy storage
Seasonal electricity storage is set to be a key aspect of fossil-free energy systems of the future. The City of Stockholm hosted an international innovation workshop with the aim of identifying potential technical solutions for seasonal storage of electricity. The workshop was organised by C40, CLEAN, and the Swedish Agency for Economic and Regional Growth and private sector experts, academia, and representatives from Stockholm, Amsterdam, Berlin, Toronto, and Sønderborg. This resulted in a market review and a large number of constructive ideas related to technologies and system solutions. The workshop also contributed to a discussion with Berlin about shared and open negotiations for continued innovation procurement.

Connected Stockholm Royal Seaport
Connected Stockholm Royal Seaport (Connected SRS) is an R&D project funded by the strategic innovation programme, IoT Sweden. The project has been tasked with developing approaches for how data platforms can be used to collect, make available, and share IoT data in the city. It is based on the need for data to streamline follow-up and management of sustainability goals. An IoT platform, which can also be used by other actors, is to be tested under the auspices of the project. It will also contribute to knowledge for procurement of city-wide platforms for open and shared data.
About the development project

Stockholm Royal Seaport is one of Europe’s largest urban development projects. Former industrial areas are being transformed into an urban environment on land owned by the City of Stockholm.

The land is managed by the City Development Administration which also manages the project in close co-operation with other City of Stockholm administrations and companies*. The project is financed by land sales and leases.

Planning for Stockholm Royal Seaport began in 2000 and land remediation started in 2004. In 2009, Stockholm City Council decided that the urban development project was to be a model in sustainable urban development. The vision and goals that the City Council established in 2010 were revised in 2017 in the Sustainable Urban Development Programme (PDF) and are once again up for review. Five strategies form the basis of the project, which combines sustainability targets and principles of city planning, and include ecological, economic, and social aspects.

Stockholm Royal Seaport’s central location – close to the waters of Lilla Värtan and the Royal National City Park – provides unique opportunities. Buildings in Hjorthagen form a link to the former gasworks, (Gasverket), where gas production ended in 2011. These former industrial buildings offer considerable potential for new, inspirational uses. Some industrial activity, such as energy production at Värtaverket and port operations, will be further developed, while others, such as the Loudden oil depot, will be phased out.

The proximity to water contributes to the dynamics of the site. It is planned that the quay area will be an integrated part of the city. As Stockholm Royal Seaport opens up and connects to the rest of Stockholm, it will become easier for people to move around, on foot or by bike, within as well as across the area.

Strengthening and creating dispersal zones for flora and fauna throughout Stockholm Royal Seaport and connecting it to the adjacent Royal National City Park strengthens the value of and connection to nature. Parks and green spaces are also defining features of this part of Stockholm.

* The companies and administrations most involved in the project are the City Planning Administration, the Transport Administration, the Environment and Health Administration, the City District Administration, Ports of Stockholm, and Stockholm Vatten och Avfall.

Stockholm Royal Seaport’s sustainability efforts have been recognised internationally. In 2015, the project was named the best sustainable urban development project in the Sustainable Communities category by the C40 Cities Climate Leadership Group at the UN Climate Change Conference in Paris.
1. Vibrant City

A vibrant city centres on people. It is open, inclusive, with functions for people at different stages of life and offers a variety of housing types. Public spaces are at the heart of urban life and provide opportunities for spontaneous, unanticipated encounters between people from different backgrounds and identities.

A vibrant city is diverse and offers amenities that ensure that the city is populated, safe and exciting at all times of the day and night throughout the year and supports business activity. It is a city characterised by equality, a place that everyone can use on their own terms, and where both women and men are included in the design of the city. A dense, green, and interconnected city facilitates walking and cycling and contributes to reduced climate impact and increased wellbeing.

Key figures are aggregated totals – and indicate progress up to and including 2019.

- **8 preschools** with 540 registered children.
- **54% rentals** including 8% student apartments.
- **20% of the public open space have social values** which equals 19 m² per apartment.

This strategy helps achieve the UN Sustainable Development Goals:
1.1 A robust and coherent city structure
The new swing bridge Husarviksbron for pedestrian and bicycle traffic across Husarviken can now also be opened to allow taller boats to pass through. The bridge is designed by &Rundquist architects and embodies the transition between city and nature. It was nominated for the Swedish Institute of Steel Construction’s building award and for the 2019 Stockholm Building of the Year Award.

The inauguration of a new elementary school, (Bobergsskolan), and a new sports hall, (Hjorthagshallen), are signs that parts of the Gasverket area are now open to the public. Gasverksvägen nearest the gasometers is now open for vehicular access. The stretch of road from Rådjursstigen to Ropsten will be widened and supplemented with pedestrian and bicycle lanes, which will be completed in the autumn of 2020. It will open for traffic when adjacent ground work is completed in approximately 2022-2023.

The Båthusparken park will connect the newer and older parts of the area and will be completed in 2020.

There are plans to address height differences with steps and elevators to Hjorthagsberget.

The Bobergsbron bridge over the Värtabanan has been replaced with a new bridge with a double-sided walkway and a two-way cycle path.

1.2 An equal city
More than half of the new homes that have been built so far are rental apartments and almost one in 10 properties are student or group housing. Forty-six per cent are tenant-owned apartments. Rents in Stockholm Royal Seaport are on a par with other new builds in central Stockholm and the size of apartments varies, with a majority being two-, three-, or four-room apartments.

In conjunction with the land allocation for Kolkajen, developers are required to provide concepts for norm-creative housing and property design. Proposals that have been received to date relate to shared spaces and their functions, and thereby reduce housing costs.

1.3 Active daily life
Centrally locating services such as supermarkets and schools contributes to accessibility and gives a vibrancy to everyday life. In the completed stages, the proportion of apartments is high. As the project reaches Ropsten and progresses further into Gasverket and Södra Värtan, the proportion of commercial spaces will increase, the average is currently 14 per cent. As the next stages contain a larger proportion of commercial premises, this proportion will increase to 30 per cent.

The first section of Bobergsskolan was inaugurated in the autumn term of 2019, and 420 pupils now attend the school up to year six. Classrooms for the upper school will be completed by 2022 so that children in the immediate area will not need to change school or travel out of the area. When Bobergsskolan is complete, it will have space for up to 900 pupils. Adjacent to the school, the full-size Hjorthagshallen sports hall, offers handball and floorball courts and fencing facilities. There is also a homework room to help pupils combine sports and study.

During the year, a Systembolaget store, Klätterverket, a café and a gym, among other amenities, located to Gasverket. Work is underway to complete the Stockholm Transport Museum and the latest phase of one of the gas towers, which are planned to open in 2020 and 2025, respectively.

The viewing platform above Hästhagsparken is under construction and is expected to open in the spring of 2020. In autumn 2020, the library on Artemisgatan will move to new and larger premises on Bobergsgatan.

The new library will also function as a meeting place and inspiration centre.

In consultation with a local youth group in Östermalm, a parkour course and several basketball hoops have been installed close to Bobergsskolan.
### 1.4 Attractive and safe city spaces

In a built-up urban environment, it is important to create open space, i.e. land that is not built on and that is accessible to all. When the Hjorthagen section of Stockholm Royal Seaport is fully developed, public open spaces with social value will constitute about 23 per cent of its surface area, which corresponds to just over 20m² per dwelling. To date, public open space with social value amounts to 20 per cent of surface area, equivalent to 19m² per dwelling.

To identify areas that are perceived as unsafe, a safety walk and fire protection drill was conducted with the involvement of the police, the City District of Östermalm, business leaders, residents, politicians, and other local stakeholders. During the walk, potential improvements to the street environment and traffic safety were identified. These included a perceived risk associated with parents dropping off their children at the school or sports hall by car.

One measure that was possible to take immediately was to supplement the lighting of the stairway at Bobergsskolan playground. Signage and painting at the school has been improved so that it is now clearer that it is a school road and that the speed limit is 30km/h. Discussions are ongoing with Stockholm Parkering about the possibility of further improving lighting in Gasverket car park.

“Safety walks play a key role in creating a safer environment. They provide us with valuable feedback about the overall project in terms of what is working and what can be improved for future design plans and construction,” explains Ricardo Weibel, Construction Manager, Stockholm Royal Seaport, Stockholm City Development Administration.

In Södra Värtan, safety reviews have been carried out in collaboration with developers, which have resulted, for example, in improved lighting in Finlandsparken and at the station building. Making large sections of a supermarket’s windows transparent was an effective way of increasing social proximity.

In 2019, local parents’ group “Parent Walks of Östermalm” conducted six walks to help make the area feel safer and more secure to live and stay in – a key focus of this initiative is on children and young people between 10 and 19 years of age.

Safety is one of the most top concerns of Stockholm Royal Seaport residents and the resident survey of 2019 showed that the proportion of people who feel safe has decreased from 91 per cent in 2016 to 79 per cent in 2019. This level remains higher than for the rest of Stockholm, where the proportion who feel safe was 70 per cent in 2019.
2. Accessibility and Proximity

In Stockholm Royal Seaport, a dense and accessible city is being created with close access to amenities and parks. This improves equality because women’s and men’s daily lives and travel patterns differ considerably. This also contributes to increased opportunities for good mobility irrespective of age, disability, or other individual circumstances.

To transport an increased number of both people and goods more sustainably in a growing city, a transition to more capacity- and resource-efficient means of transport is needed.

To reduce environmental impact, the area’s transport hierarchy prioritises walking and cycling, followed by public transport. This also has health benefits and offers advantages in terms of promoting lower cost, more equitable means of transport. Creating green spaces that encourage people to visit the area also contributes to greater biodiversity.

This strategy helps achieve the UN Sustainable Development Goals:

- 10% of the car parking spaces on development site have electric charging.
- 5 minutes walking distance to everyday service.
- 0.5 bicycle parking spaces per dwelling on development site.

Key figures are aggregated totals – and indicate progress up to and including 2019.

Photo: Eric Cung Dinh
2.1 Prioritising walking, cycling and public transport

The area is already served by public transport including a metro and several bus lines. A bus service now also stops outside Värtaterminalen.

The 2019 resident survey shows that 66 per cent of residents are satisfied with public transport. This is an improvement from 2016, when 42 per cent said they were satisfied. Residents over the age of 65 are generally more satisfied with public transport than other age groups. Stockholm Public Transport’s review of Stockholm Royal Seaport’s future public transport needs continued during the year. Various options involving bus and tram services were reviewed. To establish more sustainable travel patterns and ensure road safety from the outset, work is actively being done to keep pedestrian and bicycle routes open and safe during the construction phase.

In Gasverket, pedestrian streets have been built between culturally significant historical buildings. Prior to the start of the school term, an analysis of road safety on roads surrounding the school was conducted for those who walk and ride bicycles to the school. The analysis showed that improvements were needed, and these were implemented before the start of the school term. According to the resident survey, the perceived level of traffic safety for pedestrians and cyclists is 55 and 59 per cent in 2019 respectively, compared with 43 per cent in 2016.

The car park at Ropsten station is now home to Sweden’s first fully automated bicycle garage, (Cykelsnurran). This pilot project was co-financed by the City of Stockholm’s climate investment fund. Stockholm Parkering will evaluate the trial and if the results are positive, the solution may be introduced elsewhere in Stockholm.

2.2 Vibrant street space

Bergrumgaraget car park, (located in a cavern), with space for 1,600 cars, is expected to open in 2022. This will provide parking without taking up land above ground and without reducing the attractiveness of and proximity to public transport. The car park will primarily service Gasverket and Kolkajen residents. Caverns 40 metres below ground level at Södra Värtan will also be available. In 2020, options for using these spaces for car parking will be reviewed in collaboration with Stockholm Parkering and developers with land allocations.

2.3 Efficient, sustainable freight transport

Stockholm Royal Seaport’s Construction Consolidation Centre, (CCC), was established in 2013. The CCC controls construction site traffic in and out of the construction area. As all developers and contractors are obliged to join the CCC, logistics flows can be co-ordinated, and services offered to reduce construction site traffic in the immediate area.

In 2019, construction traffic in the area decreased by 22 per cent and the shared transport load was 80 per cent. By co-ordinating waste management from the construction area, the total transport requirement has decreased by about 50 per cent.

Increasingly, greater focus is placed on logistics planning during the early stages of projects and during implementation. A new transport booking system is open to use with other logistics systems and compatible with industry standards.

In 2019, CCC’s short-term warehouse has moved from Ropsten to the Loudden container terminal.
The relocation was carried out ahead of the soil remediation of Ropsten, which gets underway in 2020. The new location is strategic, being close to the port for loading and unloading from vessels.

In 2019, a fresh customer satisfaction survey was conducted regarding CCC’s operations. It showed that customer satisfaction had increased from 49 per cent to 70 per cent from 2017 to 2019.

In 2018, the Mass Consolidation Centre (MCC) was opened in Frihamnen to streamline bulk materials management with the help of on-site sorting and remediation. The facility is financed with grants from the City of Stockholm’s climate investment funds.

In 2019, the MCC has helped reduce the number of heavy truck journeys made to external handling facilities by 1,400. Of the excavated material journeys that were made to the centre, the reuse of bulk materials and use of efficient trucks with trailers, reduced the number of journeys from the area by 73 per cent.

Residents have complained about noise and dust. As a result, noise measurements have been carried out and sound dampening measures at the centre have been improved.

“The Construction Consolidation Centre contributes to the increased re-use of excavated materials, thereby reducing the number of journeys to and from Stockholm Royal Seaport. The Mass Consolidation Centre is a key aspect of our work on efficient and sustainable transport,” says Sofia Billersjö, soil environmental specialist, Stockholm Royal Seaport, City Development Administration.
3. Resource efficiency and climate responsibility

Stockholm Royal Seaport will be a fossil-free district with low resource use and minimal environmental and climate impact. Infrastructure is being developed with the integration energy, water supply, waste water, and transport systems.

Land is used efficiently, and the built environment is designed to last over time, which requires buildings and facilities to be of high quality, the use of non-hazardous materials, and responsible use of chemicals.

New, innovative solutions are combined with proven alternatives in such a way as to drive economic growth. Circular solutions and ground remediation reduce environmental impact on surrounding water environments and creates more favourable conditions for ecosystem services.

This strategy helps achieve the UN Sustainable Development Goals:

Measured energy use for buildings in Norra 2 is averaged to

70 kWh m² per year Aₚₑₚₚ

85 kg residual waste per person

587 MWh solar energy per year is produced in completed phases

* Includes energy for heating, domestic hot water and real estate energy.

Key figures are aggregated totals – and indicate progress up to and including 2019.
3.1 Reduced amounts of waste and increased purification levels

Waste systems for households and businesses include organic waste grinders, vacuum waste collection systems, recycling rooms, a mobile reuse station, and an automated collection station for hazardous waste. This helps to reduce heavy vehicle traffic and makes it easier to sort waste. Follow-up that has been conducted shows that all developers, with a few exceptions, fulfil the distance to refuse chutes and recycling rooms. Short distances to refuse chutes in the vacuum waste collection systems, (residual waste, newspapers, and plastic packaging), and recycling rooms, (other waste), makes it easier for residents to sort waste correctly. During the construction phase, local soil remediation and reuse of remediated excavated materials is prioritised. Construction waste is minimised and sorted.

Residual waste amounted to 85kg per person in 2019, compared to 97kg per person in 2018. The newspaper fraction reduced by 28 per cent from 2018. In Barkarbystaden, which has a comparable waste system, the amount of residual waste is 102kg, newspapers 5.7kg, and plastic packaging 3.7kg per person per year. In Stockholm as a whole, residual waste was around 216kg per person. According to FTI, a national packaging and newspaper collection body, the collection of packaging has increased, while newspaper collection has reduced by around 10 per cent in recent years.

An inventory of recycling rooms was carried out in 2019 and some deficiencies were identified, for example two properties lacked recycling rooms altogether. Pop-Up Reuse is a mobile reuse station that started in Stockholm Royal Seaport in 2015 and subsequently expanded throughout Stockholm. The aim of the service to collect items such as clothing, books, household articles and more that can be used by others and thereby reduce bulky waste. Pop-Up Reuse was in Stockholm Royal Seaport for two weekends and was used by a total of 12,880 people. Approximately 7,000 items, weighing 2.1 tonnes found new owners. Furthermore, 250kg of electronic waste and 80kg of hazardous waste was also collected.

Follow-up shows that to date none of the developers meet the requirement on construction waste, but on average 43kg/m$^2$ GFA has been generated. This is partly due to developers not working proactively enough to prevent and reduce amounts of construction waste and partly due to the lack of quality assurance during the construction phase. Therefore, in future stages, all developers need to develop a waste management plan.

3.2 Resource-efficient water and effluents

Resource-efficient wastewater systems have been explored since 2011. The MACRO innovation project that started in 2015 has investigated the viability of implementing source-separating wastewater systems for Södra Värtan and Loudden. Planning for such a system in Södra Värtan is due to start in 2020/21. Read more on page 8.
3.3 Circular construction and management processes

Land in many parts of Stockholm Royal Seaport is polluted by former industrial activity and to date, 27 per cent of the soil has been remediated, an area almost equivalent to 50 football pitches. In 2019, approximately 8,400 tonnes of excavated materials were recycled, which would otherwise have been transported at two external reception facilities. To date, more than two million tonnes of excavated materials have been handled on site and almost 800,000 tonnes have been recycled. The mass balance is about 41 per cent.

An environmental and health risk assessment of soil remediation methods was completed in October 2019. This has resulted in soil remediation of Kolkajen on site with chemical oxidation using persulfate in combination with lime cement stabilization. This method reduces both the need to transport pre-purified excavated materials and to return new excavated materials.*

The first phase of the remediation of the car park in a cavern under Hjorthagsberget is complete. This space was previously used for naphtha storage with water as a balance medium. Water has been purified with the help of air-stripper and archaees – ancient microorganisms – that break down oil products. This method may also be used in other parts of the area.

The development of Loudden has started and planning work is underway. Oil companies’ operations at the site ceased in 2019 and the remediation to meet the Swedish Environmental Protection Agency’s general guidelines for less sensitive land use (MKM) is expected to be completed in 2021. Thereafter, the City of Stockholm will carry out additional remediation to meet site-specific requirements. Contaminated buildings related to former oil operations and storage towers will be demolished.

In spring 2020, the container terminal was relocated to a terminal built by Ports of Stockholm in Norvik, south of Stockholm.

3.4 Efficient energy use

To reduce energy use, all new buildings are low-energy buildings with well-insulated building envelopes and energy-efficient fittings. The first review of Norra 2, after two years of occupancy, showed that projected values for energy use were exceeded. Measured energy use in Norra 2 was on average 70kWh/m² per year Atemp and is therefore 33 per cent lower than the target level. This is also 22 per cent lower than the applicable Swedish building code regulations and means that buildings in the area meet the zero-energy directive.

Dialogue continued with developers on troubleshooting and corrective measures during the year. Proactive and transparent collaboration between all parties has created an important knowledge platform. This work shows the most significant deviations from target values are due to substantial use of heating and metering errors.

The causes of this are currently being reviewed. Flaws also exist in the handover from project planning to construction work and from construction to property management. Developers will present the results of this work after the 2021 warm-up season. This experiential feedback with learnings from Norra 2 will make a key contribution to the overall development of the construction sector.*

* Includes energy for heating, domestic hot water and real estate energy.
Energy used by the vacuum waste collection system did not achieve target levels, as the system is not yet fully operational. Compared to previous years, energy use for all fractions increased. The increase is mainly due to the number of emptying cycles being constant despite a decrease in the amount of waste. In the autumn, a leaking valve was discovered that also contributed to increased energy use. This fault has been rectified and energy use is expected to reduce in 2020.

LEDs are used to illuminate public spaces and security lighting has been installed in certain areas. Light levels are lower when pedestrian and cycle paths are unused but lamps switch to full beam when people are detected. This has resulted in cost savings of between 30 and 50 per cent.

3.5 Fossil-free by 2030
Most buildings are connected to the district heating system and Stockholm Exergi works actively with replacing fossil fuels with bio-based fuels at Värtaverket. To contribute to a fossil-free energy system, solar energy or solar heat is produced on all buildings. In 2019, 587 MWh were produced on the roofs of buildings in completed phases. Solar panels at the Mass Consolidation Centre produced approximately 248 MWh in 2019, meeting the energy requirement for the plant. These panels supply, amongst other things, screeners, lighting, a water treatment plant, and ventilation system.

The Construction Consolidation Centre organises all transport to and from the construction area. Co-ordinated construction waste management have reduced the total transport requirement by around 50 per cent and the shuttle truck is powered by 100 per cent HVO, a renewable diesel fuel.

Achieving a fossil-free transport system requires national regulation. Charging facilities are being expanded, both in car parks and for on-street parking.

3.6 Low climate impact
During the design and construction phase, a substantial proportion of climate impact depends on the materials used. All developers shall, at an early stage, make climate calculations for a building. To simplify the calculation methodology and increase comparability, Stockholm Royal Seaport participates in an innovation project, financed by the Swedish Energy Agency, to test and evaluate the construction sector’s environmental calculation tool, developed by the Swedish Environmental Research Institute.

Climate calculations for public open spaces were carried out at two facilities in 2019 and knowledge building is ongoing. Climate impact from energy use from finished buildings was calculated and stood at 1,640 tonnes of CO2e in 2019, equivalent to 248 kg CO2e per person.

*Emissions are calculated using data from developers and residents, as well as calculations provided by the City of Stockholm’s Environment and Health Department. 100% of commercial property electricity and 30% of residential property electricity is supplied by green electricity.
3.7 Good indoor climates
80 per cent of developers achieve gold standard for indoor climate indicators. Deviations that have arisen are related to thermal climates during summer months and to daylight. To ensure a good indoor climate, quality assurance during construction and demand-controlled ventilation are crucial factors. Levels of daylight are affected by the city structure. Early collaboration between architects, and energy and indoor environment experts is therefore extremely important.

A particular challenge in Södra Värtan is low-frequency noise from ships docked at the nearby port. There are currently no approved types of windows on the market that counteract low frequency noise.

3.8 Sustainable selection of building materials
The chemical composition of all building materials used in Stockholm Royal Seaport is checked based on the precautionary principle.

All developers and the City of Stockholm’s contractors use one of the national assessment systems, document building material, and report any deviations. The City of Stockholm has ensured that the amount of infrastructure products included in the Byggvarubedömningen has increased.

To help improve working conditions in the production of natural stone, ethical requirements are included in procurement agreements with contractors. In 2019, all natural stone purchases were checked, and requirements were met.

Contractors are also required to conduct a self-assessment on ethical responsibility in the supply chain, and in 2020 a more detailed study will be carried out for steel and wood.

Contactors are also required to conduct a self-assessment on ethical responsibility in the supply chain, and in 2020 a more detailed study will be carried out for steel and wood.

3.9 Robust construction
The built environment is supposed to last over time which requires buildings and facilities to have high-quality design. During the year, a lifecycle cost analysis (LCCA) of waste bins in public places was conducted. The analysis shows that bins connected to the vacuum waste disposal systems are the most cost-efficient alternative compared to conventional bins and solar panel-powered self-compacting bins.

An LCCA was carried out for fall protection which shows that rubber asphalt is the most cost-efficient, closely followed loose filling material such as bark and woodchip. Cork is more cost-efficient than sand and sand is cheaper than artificial grass. However, the sensitivity rating included in the lifecycle cost analysis suggests that this depends on how frequently an area is used.

LCCA suggests that if maintenance of loose fall protection material is conducted less often than on a weekly basis, then loose fall protection material is more cost effective than synthetic fall protection. The City of Stockholm is reviewing potential environmental and health risks posed by synthetic fall protection materials due to chemical content and the spread of microplastics. Costs for operational measures that may be required due to the risk of synthetic fall protection breaking prematurely were not included in the analysis.
4. Let Nature Do the Work

Water and vegetation in Stockholm Royal Seaport play a key role in the social, economic, and ecological development of the area. Through intelligent design, blue and green structures can fulfil multiple functions, contribute to synergy effects, and provide ecosystem services. This offers opportunities in terms of recreation and attractiveness values that contribute to improved health and wellbeing.

The local climate is improved, and the effects of coming climate change reduced; meanwhile biodiversity increases, and dispersal zones strengthened, making the city more resilient to future challenges. Furthermore, food cultivation at scale in the area can contribute to local food production.

This strategy helps achieve the UN Sustainable Development Goals:
4.1 Create and strengthen ecosystem services

Development sites
Green Space Index (GSI) as a requirement document in combination with stormwater strategy supports well-thought out solutions that sustain plant growth, contributes to stormwater retention and recreational pursuits at development sites. The size and design of courtyards, walls, and roofs influence how much eco-efficient surface can be created. To date, 22,500m² green roofs and 34,100m² green courtyards have been installed.

To create functional and sustainable solutions, it is important that developers and different technical disciplines are co-ordinated at an early stage. In addition, the following factors are crucial to achieve good results: correctly constructed plant beds with sufficient depth for retention capacity over time, plenty of plants, and connected stormwater solutions that purify and retain and release water to vegetation. It is important to introduce solutions that are easy to maintain, operate, and that maintenance plans are drawn up.

In 2019, a GSI for industrial facilities in Energihamnen was established for the first time. There are large paved surfaces in the area and Energihamnen is an important part of the link to Hjorthagen’s ecological environments and the port area’s business activities. Work on this project is a close co-operation between the City of Stockholm and developers and is due to be completed in 2020.

The 2019 resident survey shows that 68 per cent of residents are satisfied with the outdoor environment in their courtyard areas.

Public open spaces
High-quality green structures in public open spaces are crucial in enabling ecosystem services. In all, 42,500m² – or six football pitches – of new park area has been created. That is the equivalent to 17m² per dwelling. Street vegetation and rain gardens cover a total area of 3,250m².

Sixty trees of around 10 different species were planted during the year. Trees provide shade and reduce temperatures. On streets, water is channelled to tree pits and green spaces with biochar-infused soil enables large amounts of water can be disposed of while at the same time guaranteeing favourable plant-growing conditions. In 2019, work started in the Båthusparken area. It includes a large grass area with seating edged with beds of bushes and trees. These plant beds also receive stormwater from surrounding streets. Street planting started in the Brofästet area in 2019. The majority of street planting sites are so-called rain gardens that are designed to receive and retain stormwater. The plant substrate comprises biochar-infused macadam. The biochar comes from Stockholmers’ garden waste and is ideal for improving soil and sequestering CO₂. To date, biochar used in Stockholm Royal Seaport has sequestered 1,700 tonnes of CO₂.

Prior to soil remediation work in Loudden, more than 1,000 protected salamanders were moved from a pond in the area to a new pond near Kaknästornet. Follow-up has shown that they have settled well there. More salamanders will be moved in 2020.

“The salamanders probably lived here before the container terminal was built about 100 years ago. Dock workers replenished the pond when it dried out and the salamanders have flourished,” explains Kristin Quistgaard, planning manager for Loudden.

The 2019 resident survey shows that eighty-seven per cent are satisfied with the area’s outdoor environment and 84 per cent visit parks and natural areas on a daily basis or several times a week.

*This year’s figure is lower than previously reported due to a definition change. Park space are parks of at least 0.2 hectares.
An inclusive process is based on opportunities for participation and consultation during all phases of city development. It is crucial that stakeholders can participate in different ways. By using a variety of methods to drive engagement and influence, greater numbers of people, irrespective of gender, age, and background, can be included in the process.

Communication is key to creating interest and participation. Research, innovation, knowledge development, and experience sharing are important factors to identifying sustainable solutions to complex challenges and can contribute to synergy effects in all target areas relevant for developing sustainable cities. Furthermore, the work with Stockholm Royal Seaport contributes to job creation.

This strategy helps achieve the UN Sustainable Development Goals:
5.1 Active participation in the city development process

An active dialogue with residents and businesses in the area helps establish city development and brings with it valuable knowledge to planning processes. According to the 2019 resident survey, 83 per cent of residents are interested in knowing more about the development of Stockholm Royal Seaport, primarily about ongoing construction activities. 35 per cent are interested in participating in the area’s development through consultation and information meetings, and 37 per cent via social media.

Consultations were held concerning detailed planning proposals to preserve and develop the eastern part of Gasverket in Hjorthagen. Reactions were mostly positive, and questions related to, for example, the need to have more park and playgrounds and the density of buildings.

In 2019, the Mass Consolidation Centre was opened to the public on three occasions. Read more on page 17.

The project has a popular Facebook page, which has 4,200 followers and is used primarily to communicate with residents and businesses in the area. In 2019, 190 posts were published which were primarily about progress on development of the area and local events, as well as sustainability issues.

Ports of Stockholm, Stockholm Royal Seaport, City District Administration of Östermalm, Stockholm City Museum, and several of the port’s tenants hosted Frihamnen Live – a celebration marking the centenary of the opening of Frihamnen. Host organisations provided information about the continued development of the area, with particular focus on Värtahamnen, Frihamnen, and Loudden. There were children’s activities, guided tours, as well as short presentations about urban farming and beekeeping.

Artistic collective “Blivande” is a new tenant in one of Ports of Stockholm buildings in Frihamnen and runs Frihamnstorget which is designed to work as a collective workshop for artists, co-working offices, and as a meeting place for non-profit, cultural group “Noden”.

“It’s extremely exciting to bring in yet another public organisation that attracts a new target group to the area through a mix of publicly creative activities and unique events,” says Louisa Åkerfeldt unit manager, strategic property management, Ports of Stockholm.

On “Gasverket Day 2019”, a new elementary school, (Bobergsskolan) and a new sports hall, (Hjorthagshallen) were officially opened. Guided tours of Gasverket, the school, and sports hall were organised as well as activities for all ages. The event attracted more than 3,000 participants.

Ninety urban farming plant boxes have become natural meeting places for residents and are maintained by the Hjorthagsodlarna group with support from the City District Administration of Östermalm.

Beekeeping, which is conducted by the Bee Urban company, contributes to greater knowledge about biodiversity and visits have been organised for pre-school children and residents.

Two thematic tours for residents were organised during the year, in which approximately 40 people participated. The first tour offered people who had recently moved to the area the opportunity to get to know their new and sustainable area of the city. The second tour focused on green structures and City of Stockholm experts explained how the city is equipping the area to face climate change. Why parks are located where they are and why it is important to prioritise vegetation in the city.

At the beginning of the year, residents were asked what types of activities they would like to see in the parks. This resulted in a winter plan for Östermalm parks that included making bird tables available.

5.2 Sustainable consumption

The sharing economy is crucial to reduce consumption and increase knowledge and awareness about personal consumption. The Pop-up Reuse Centre has, in addition to contributing to reducing the amount of waste through increased reuse, also increased understanding of consumption patterns and environmental impact. Furthermore, the centre has become a meeting place for residents. Read more on page 19.

5.3 The role of business and the public sector

In 2019, requirements were made of two of the city’s construction procurements to provide employment for individuals outside the labour market. This has, however, not resulted in jobs being created. From soil remediation in Södra Värtan onwards, all developers are subject to these requirements.

Pre-schools in Stockholm Royal Seaport have Keep Sweden Tidy Green Flag certification, a national
framework for how schools and pre-schools can teach sustainability issues in inspirational ways. To date, four of eight pre-schools in the area have been certified.

“Hållplatsen”, a forum for dialogue and playful learning for pre-school children and their parents, was held. In all, around 1,260 children participated in these activities.

In 2020, the City District Administration of Östermalm will review access to venues for increased participation.

5.4 Knowledge-building and experience sharing

The ambitious sustainability goals of Stockholm Royal Seaport require co-operation and shared learning that results in innovative solutions and tools, as well as new business models. During 2019 a number of innovation activities related to Stockholm Royal Seaport have been ongoing. Read more on page 17.

Since 2010, Stockholm Royal Seaport has run a capacity development programme in the form of a series of seminars to which developers, their consultants, and City of Stockholm officials were invited to deepen knowledge of key issues. To increase opportunities for different suppliers to meet developers, “matchmaking” seminars have been held since 2012, known as “Forum for Sustainable Solutions”, where innovative products and service are presented.

In 2019, 110 people participated in three seminars, no forums were held. To date, a total of 3,258 community builders have participated in a variety of capacity development seminars. Read more

Stockholm Royal Seaport regularly hosts a large number of study visits to share experiences and sustainable urban development solutions. During the year, we welcomed 6,000 visitors from 57 countries. Since 2012, a total of 40,000 visitors from more than 120 countries have visited the area. Many visitors have been interested in applying tools, for example the Green Space Index, to their own municipalities.

In 2019, representatives from Stockholm Royal Seaport participated in workshops, conferences, and industry events such as World Water Week and Samhällsbyggardagarna in Stockholm, Mayors Summit in Copenhagen, and Urban Future in Oslo.

The project also participated in international fairs such as ExpoReal in Munich and Smart City Expo in Barcelona. Under the auspices of the C4O City Solutions Platform, Stockholm Royal Seaport hosted an international workshop related to the challenge of electricity storage.

Participation in the C4O network Zero Carbon Districts Forum as part of the Climate Positive Development Programme (CPDP) is now terminated. New forms of co-operation are currently being discussed.
How we work

When Stockholm Royal Seaport was designated by Stockholm City Council as a sustainability profile area, it was decided that the City Development Administration would lead and manage the project. Structures were established to enable administration- and company-wide working groups, including municipal experts, to collaborate.

The task of the working groups is to review sustainability targets, which are then set as requirements for developers in the same way as they are for the City of Stockholm’s own projects. The City of Stockholm owns the land and the requirements are included in land allocation- and development contracts. These requirements are reviewed and verified at all phases of a project – from preliminary concepts all the way through to property management. Developers submit results in an online database which are reviewed by City of Stockholm experts. If requirements fail to be met, a request for deviation from the requirements may be submitted. If such a request is rejected, the requirement in question is registered as not having been met. Working groups continuously evaluate work and results. This, in combination with external monitoring, results in constant improvement to the requirements. Working group participants are also required to share experiences within their administrations and companies and with other City of Stockholm projects. Continuous capacity development is crucial to meet the project’s high ambition levels. Read more on page 25-27.

Stakeholder Analysis

Dialogue is an important tool to capture the different expectations that exist about Stockholm Royal Seaport. Key stakeholders include politicians, developers, City of Stockholm officials, society in general, and of course the residents of the area. The issues that are most relevant to stakeholders have been summarized in the materiality analysis. It shows that the most important is reduced environmental impact, efficient energy use, waste management, research and development, and transport. For residents and politicians, safety is an important issue.

Project working environment

Stockholm Royal Seaport strives proactively to ensure a safe working environment. The project initiates and runs a number of preventative programmes to create safe and secure construction sites. To include the views of all those who live in and around the construction area, risk mapping, logistics and operational information, as well as fire drills and safety walks focusing on pedestrians and cyclists are carried out.

Personal development interviews and employee surveys are conducted annually. High workloads are the biggest challenge within the organisation and an action plan has been developed to address this issue.

About Stockholm Royal Seaport and Agenda 2030

In 2015, UN member states adopted Agenda 2030, an ambitious and comprehensive development agenda incorporating the 17 Sustainable Development Goals, (SDGs), or Global Goals. The SDGs are integrated and indivisible and several of the goals are dependent upon and closely linked to each other, which means that success in one goal has positive effects on other goals. The 2030 Agenda is global, but it is at the local level that large parts of the commitments and work on the goals are put into practice, and it is appropriate that Stockholm should be a leader in their implementation.

Agenda 2030 focuses on how cities create good access and participation for all citizens, a favourable climate for businesses and innovation, and attractive housing environments. At the same time, cities are required to reduce their environmental and climate impact, break unsustainable consumption and production patterns, fight segregation and inequality, and increase equality. Work on Agenda 2030 also stimulates collaboration, bridges stepping stones and organisational boundaries and is characterised by learning and the exchange of experience. The development of Stockholm Royal Seaport is primarily based on SDG 11, Sustainable Cities and Communities, but it works actively with all SDGs.
Comments from the sustainability strategist

There is considerable interest in our work in Stockholm Royal Seaport. Since 2010, 40,000 community builders have visited the area to learn more about how we work.

We also have intensive exchanges with other projects, both nationally and internationally. A key task is sharing experiences and learnings together with developers in conjunction with the review of the Norra 2 phase.

Developers involved in the Norra 2 phase are showing considerable commitment to meet the strict requirements, although have not met those relating to energy use. Despite this, results are still on average 22 per cent better than the Swedish National Board of Housing, Building and Construction regulations (BBR). The fact that differences between measured and projected values are large is a challenge for construction sector stakeholders and offers considerable scope for improvement. It is clear that the skills needed to build sustainably need to be strengthened in the construction sector and in the City of Stockholm.

To remain at the forefront of what we do and to share experience, to gain access to research findings and to draft new guidelines, we have begun work on revising the Sustainable Urban Development Programme for Stockholm Royal Seaport.

If we are to achieve ambitious sustainability targets, new business models and combinations of technical solutions are required. And above all, courage, commitment, and collaboration between all parties involved.

Christina Salmhofer
Sustainability Strategist
Stockholm City Development Administration
Achievements 2019

1. Vibrant City

<table>
<thead>
<tr>
<th>Goal</th>
<th>KPI</th>
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<tbody>
<tr>
<td>1.1. Create a robust and cohesive city structure</td>
<td>80% of residents are extremely/fairly satisfied with the accessibility of nearby areas by foot/bike. Resident Survey 2019.</td>
</tr>
<tr>
<td>1.2 Contribute to the creation of an equal city</td>
<td>54% rental dwellings (of which 8% student dwellings) and 46% tenant-owned dwellings (of which &lt;1% freehold, &lt; 1% semi-detached, 2% 55+). Varied dwelling sizes as follows: 10% one-room, 34% two-room, 29% three-room, 24% four-room, and 3% five-room or larger.</td>
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<tr>
<td>1.3 Plan for well-functioning everyday life</td>
<td>26% of residents are extremely/fairly satisfied with access to pre-schools and schools, 12% with cultural activities. 47% of residents are extremely/fairly satisfied with access to play areas for children under 6 and for children over 6, that number increases to 26%. (A large proportion of respondents answered: “Don’t know”, presumably as they did not have children in those age groups.) Resident Survey 2019. 64% of residents are extremely/fairly satisfied with access to grocery stores. The equivalent number for restaurants, cafés etc. is 47%. Resident Survey 2019. 72% of residents are extremely/fairly satisfied with access to courtyards and meeting places and 42% with sports and leisure facilities. Resident Survey 2019.</td>
</tr>
<tr>
<td>1.4 Create spaces that are attractive and safe all day, all year</td>
<td>Commercial space: 14%. Public open spaces with social values: 20% (= 19m²/dwelling). 79% of residents are extremely/fairly satisfied with safety in the area. Resident Survey 2019.</td>
</tr>
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Sustainable development goals:

2. Accessibility and Proximity

<table>
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<tr>
<th>Goal</th>
<th>KPI</th>
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<tbody>
<tr>
<td>2.1 Prioritise walking, cycling, and public transport in planning</td>
<td>Shortcut ratio varies between 1.07 and 1.36 for those who have furthest to walk to key destinations (Norra 2). 89% of residents are extremely/fairly satisfied with access to pathways/pavements. 77% for cycle paths and 66% for public transport. 59% are extremely/fairly satisfied with road safety for pedestrians and 56 for cyclists. Resident Survey 2019.</td>
</tr>
<tr>
<td>2.2 Plan for living street spaces that support flexible use</td>
<td>2.2 bicycle spaces/dwelling on development sites and 0.17 per dwelling on public spaces. 0.5 car parking spaces/dwelling on development sites and 0.14 per dwelling on public spaces. 8% of on-street car parking spaces are reserved for carpooling. See KPI 1.4.</td>
</tr>
<tr>
<td>2.3 Infrastructure should support co-loading and efficient, sustainable freight</td>
<td>Effects of Co-loading in the construction area is 80%.</td>
</tr>
</tbody>
</table>

Sustainable development goals:

3. Resource Efficiency and Climate Responsibility

<table>
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<tr>
<th>Goal</th>
<th>KPI</th>
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<tbody>
<tr>
<td>3.1 Continually reduce the amount and increase the purity of waste</td>
<td>Residual waste: 84.8 kg/person (2019) and 97 kg/person (2018). Newspaper: 10.7 kg/person (2019) and 14.3/kg/person (2018). Plastic packaging: 7.3 kg/person (2019) and 8.1 kg/person (2018). Almost 2.1 tonnes of items got new owners through a mobile reuse centre in 2019. Construction waste (developers) Average amount of construction waste: 43 kg/m² BTA . Construction waste (public spaces): 38% was recycled, 28% to energy recovery, 19% reuse, 15% mixed and &lt; 1% to landfill. 100% of households and businesses have kitchen grinders.</td>
</tr>
<tr>
<td>3.2 Water and wastewater management should be optimised in terms of energy and resource management</td>
<td>Measured (requirement 55kWh/m²/year Norra 2) =70kWh/m² Atemp per year (purchased energy). Dwellings, average measured energy use 22% under applicable Swedish building code regulations in Norra 2. LED for lighting (public spaces): 1.8 kWh/km resulting in energy savings of 60%.</td>
</tr>
<tr>
<td>3.3 Support a circular construction and management process</td>
<td>27% of land in the area has been remediated. Mass balance is 39%.</td>
</tr>
<tr>
<td>3.4 Efficient energy use in buildings and facilities</td>
<td>Measured (requirement 55kWh/m²/year Norra 2) =70kWh/m² Atemp per year (purchased energy). Dwellings, average measured energy use 22% under applicable Swedish building code regulations in Norra 2. LED for lighting (public spaces): 1.8 kWh/km resulting in energy savings of 60%.</td>
</tr>
<tr>
<td>3.5 Stockholm Royal Seaport is to be fossil-free 2030.</td>
<td>Dwellings, average solar energy produced: measured 587MWh el (Norra 2). 8% of on-street car parking are assigned for electrical charging (car-pooling) and there is one fast-charging station. 10% of car parking spaces on development sites have electrical charging, i.e. 0.05 charging posts/dwelling on development sites and 0.01 charging posts/dwelling in public spaces.</td>
</tr>
<tr>
<td>3.6 Low climate impact of buildings and facilities from a lifecycle perspective</td>
<td>Average climate effect (public spaces): Norra 1: 260 kg CO₂eq/m², Västra: 840 CO₂eq/m², Norra 2: 100 CO₂eq/m². Climate emissions of energy use in Norra 2: Total amounts are 1,640 tonnes CO₂eq which is equivalent to 248kg CO₂eq/person.</td>
</tr>
<tr>
<td>3.7 Good indoor environments in design and use of buildings</td>
<td>Does not include Norra 1, Västra, Värtsalatunneln or Södra Värtan. 80% of developers meet Miljöbyggnad Guld standard (indoor environment). Does not include Norra 1, Västra, Värtsalatunneln or Södra Värtan.</td>
</tr>
<tr>
<td>3.8 Sustainable choice of construction materials</td>
<td>Proportion of approved deviations of total notifications: developers: 48%, public spaces: 25%. Does not include Norra 1, Västra, Värtsalatunneln or Södra Värtan. 100% of developers and City of Stockholm contractors document materials in digital logbooks. Wood 100% FSC-labelled, natural stone 100% meet the City of Stockholm’s ethical requirements.</td>
</tr>
</tbody>
</table>

Sustainable development goals:
4. Let Nature Do the Work

**Goal**
4.1 Use ecosystem services to build a resilient and healthy city environment

**KPI**
- 94% of developers achieve GSI.
- 100% of dwellings have access to parks and natural areas within 200 metres.
- Biochar that are used in planting beds in Stockholm Royal Seaport have so far bound 1,700 tonnes CO₂.

**Sustainable development goals:**

5. Participation and Consultation

**Goal**
5.1 Stimulate active participation in the development of Stockholm Royal Seaport towards a sustainable and open city area

**KPI**
- Consultation Gasverket Östra, two information meetings MCC.
- 90 planter boxes, two theme tours. Gasverksgiving, Frihammen Live and architecture festival open house attracted a combined total of 8,500 visitors.

5.2 Create conditions for sustainable consumption

**KPI**
- Pop-up Reuse: twice in the area in 2019 (12,880 visitors and around 7,000 items weighing 2.1 tonnes got new owners).
- Car-boot sale in Södra Värtan.

5.3 Private and public activities contribute to the sustainable profile of the area

**KPI**
- Four pre-schools out of eight are Green Flag certified.

5.4 Knowledge and experiences generated in Stockholm Royal Seaport is to be shared

**KPI**
- 10 ongoing R&D projects.
- Capacity development in 2019: 110 participants.
- Capacity development programme had a total of 1,334 participants and forum for sustainable solutions had 1,914 participants.
- 6,000 study visitors in 2019, 40,000 since 2012.
### Glossary

**Active ground floors**
Mixed-use ground floors that contribute to making streets and other areas attractive to people at different times of the day. This may refer to shops, cafés, restaurants, laundries, community venues, or bike rooms with workshops.

**CO₂e**
Carbon dioxide equivalent, the amount of a certain greenhouse gas, for example methane, expressed as the amount of carbon dioxide that creates the same green house effect.

**Ecosystem services**
Ecosystem services are all the different benefits accruing to humans from nature and that contribute to our wellbeing and quality of life. Urban nature is more than simply a decorative detail for city inhabitants, it also has many important functions. With sound planning, one and the same green area can at the same time contribute to improvements in public health, provide habitats for insects, reduce noise, and mitigate stormwater.

**Form factor**
Describes how compact a building is. Calculated as the ratio between a building’s enclosed area, (exterior walls, exterior roofs, and bottom plate) and heated square metre area (m² Atemp).

**Green oasis**
An area dominated by vegetation covering at least 300 m².

**Green Space Index (GSI)**
A tool used to calculate eco-efficiency of given spaces, i.e. spaces that contribute positively to an area’s ecosystem and local climate as well as social values linked to greenery and/or water.

**Greywater**
Bath, shower, dish and laundry water.

**Gross floor area (GFA)**
Gross floor area is the sum of all a storey’s floor area up to the exterior walls of enclosed building parts.

**Hydrated Vegetable Oil, HVO**
A renewable fuel that can be blended in diesel or that can replace diesel in diesel engines.

**Målupptäckning: a national Swedish certification for sustainable buildings**
Målupptäckning is a national Swedish certification system for buildings awarded by the Sweden Green Building Council.

**Mobility Index (MI)**
Calculation tool for evaluating sustainable travel with measures taken at property level.

**Neighbourhood park**
A large park of at least three hectares, which functions as a destination and a social meeting point for a neighbourhood, or a larger part of one or more neighbourhoods.

**Park space**
Park space are parks of at least 0.2 hectares.

**Public open spaces with social value**
Calculated as a percentage of the total area of completed detailed development plans.

**Residual waste**
Waste that remains when hazardous waste, electrical waste, bulky waste, organic waste and recyclable material have been sorted.

**System integration**
Several different stand-alone systems combined in such a way so as to work together.

**Swedish building code**
A collection of regulations and general advice drawn up by the National Board of Housing, Building and Planning and that apply to all buildings in Sweden.

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**Norra Djurgårdsstaden: Stockholm Royal Seaport**

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Photo: Eva Nielsen