Profile description of the Chair of Ports and Waterways

1. Position of the Chair of Ports and Waterways

1.1 Background
With a growing global economy, the demand for transport continues to increase whereas reliability, flexibility and environmental impact are for a long time key issues in the maritime transport sector. Particularly the flexibility of infrastructure to adapt to changes in climate, economic orientations and society is considered important. These developments ask for innovation and cause a great need for research and education that focus on the technical aspects of nautical systems, port development and inland waterway transport, which at the same time pays attention to the integration with other disciplines such as economy, logistics and ecology. The professor of Ports and Waterways is expected to play a key role in developing innovations and engineering concepts in the context of applications. The position can be considered unique regarding educating engineers and performing research with practical relevance for the nautical transport and port sectors. The chair is part of the Hydraulic Engineering department of the Civil Engineering and Geosciences faculty.

1.2 Position within the Department of Hydraulic Engineering
The Rivers, Ports, Waterways and Dredging Engineering section is part of the Department of Hydraulic Engineering (HE) that generates and disseminates academic knowledge in an internationally highly respected Dutch tradition. An important aim of the department is to keep a leading role in education and research related to problems in hydraulic engineering and in the development of new approaches and solutions. To do so, a balance between science, engineering and design is deemed necessary. Examples of fields of major interest are the development of water infrastructure, coastal zones, rivers and the protection against flooding. In addition, the department deals with the behaviour of fluids, offshore technology, design of hydraulic structures, dredging and logistics of ports and waterways. To support the development of innovative solutions, the department uses its own advanced experimental facilities, field work and computational models. Given the societal relevance and multi-disciplinary nature of hydraulic engineering issues, cooperation with organizations outside the university (government, research institute, private sector) is essential to the method of working of the department.

Organisation of the Department
The department of Hydraulic Engineering (HE) is composed of five sections (see figure below):

1. Hydraulic Structures and Flood Risks (HSFR),
2. Environmental Fluid Mechanics (EFM),
3. Coastal Engineering (CE),
4. Offshore Engineering (OE),
5. Rivers, Ports, Waterways and Dredging Engineering (RPWDE).

In total there are 6 fulltime chairs and 5 part time chairs. The permanent staff of the department of Hydraulic Engineering comprises around 65 persons representing 40 FTE. Within various collaboration networks with the hydraulic engineering sector about 100
practitioners/researchers are actively involved in research and educational activities. About 100 PhD-students do their research projects in the department, often with involvement and contributions from sector parties.

Figure 1: Chairs (in white) within the department of Hydraulic Engineering at TU Delft: Sections and their relative position are indicated by dark blue ovals: RPWDE, HSFR, CE, OE and EFM. Part-time positions on specific applications are indicated in light blue. The chair of ports and waterways is indicated by a red dashed oval.

1.3 The section of Rivers, Ports, Waterways and Dredging Engineering
The group of Ports and Waterways is part of the section RPWDE, connecting rivers to waterways and navigability and port operations to dredging. The section is responsible for the educational program for the specialisation RPWDE within the track of Hydraulic Engineering (Master Civil Engineering). The research activities of the group Ports and Waterways focus on port design, vessel-waterway interactions, logistics and design of terminal infrastructure, safety and waterway traffic management. Also concepts as optimisation, integration, adaptation, sustainability are included and methodologies related to stakeholder inclusive design and building with nature are being developed in the group.

The Ports and Waterways group has links with the other sections in the department, for example in the field of quay walls, breakwaters, lock design and other structures, as well as probabilistic analysis, with the group of hydraulic structures (prof. Jonkman), and interactions in the field of waves, mud and (density and ship-induced)currents with the fluid mechanics and rivers groups (profs. Reniers, Pietrzak, and Uijttewaal). Interventions through coastal and offshore structures, such as harbours, coastal protection works, off-shore wind and dredging operations, form important parts of the field of competence of the HE department that link with the section RPWDE.

In short: the group brings together different knowledge disciplines in order to create a base for students to make sustainable robust port and waterway designs.

The ports and waterways group consists of one part-time full professor (this position), one full-time tenured staff member and 4 part-time staff members that have their main positions within the sector. There is one full-time position vacant for a tenure track assistant professor.
1.4 Position within Delft University
The chair of Ports and Waterways is closely collaborating with other groups and institutes within Delft University of Technology, both within the faculty of Civil Engineering and Geosciences (CEG) as well as with other faculties. Important collaborations include those in the field of Transport and Planning through the interfaculty MSc-program on Transport, Infrastructure and Logistics (TIL), Maritime and Transport Technology (3Me), Geo-engineering (CEG), Delta Urbanism (Architecture), Technology, Policy and Management (TPM), ship design (3Me) and mathematical and numerical approaches (EWI). The group is represented in several university-wide institutes such as the Delft Infrastructures and Mobility Initiative (DIMI), institutes and centres on water, climate and flood risk. Also, a role is envisaged in the new Delft Global initiative that focuses on science and engineering in developing countries.

1.5 Position in the broader field
The group and chair holder have active collaboration with other academic groups and research centres in e.g. Rotterdam, Antwerp, Singapore and Buenos Aires. Examples of successful collaborations focus on the themes of Green Ports, Building with Nature, Smart Ports and Climate Adaptation.

A specifically close collaboration is active and foreseen with the Coastal Systems, Engineering & Port Development group at Unesco IHE in Delft. Professors and PhD candidates in the field of ports, rivers and coastal engineering at IHE generally have dual appointment at DUT and IHE. The group has an extensive academic network with leading academic institutes in the same fields.

The group has active collaboration with research institutes, government, and industry. There is close collaboration at different levels of research (MSc, PhD, staff, programs) with Port of Rotterdam, Deltares, Rijkswaterstaat and other governmental organisations, engineering and consultancy firms, knowledge institutes and the Dutch dredging sector.

2 Key characteristics of the position

2.1 Appointment and responsibilities
This is a part-time position (0.3-0.4 FTE) at the highest academic level, in the section of RPWDE. The professor will be the lead of the Ports and Waterways group and responsible for the further development of it. It is expected that the candidate can establish a strong link with the engineering practice and should therefore hold another part-time position in a field relevant for this chair, preferably in a port-related company such as Port of Rotterdam, the industry, consultancy, a knowledge institute or governmental organisation.

The key characteristics and responsibilities include education, research, services, valorisation and management – as further elaborated below.

Teaching
The professor of Ports and Waterways is responsible for a successful and innovative (both in content and educational methods) contribution within the 2-year Master track that leads to the title of Civil Engineer (equivalent to an MSc. degree). Besides, the professor will actively take part in the teaching activities in various courses on hydraulic engineering at the master level.
Teaching activities include also the management and supervision of students in individual exercises, group projects, Master theses and PhD. theses. In the development of learning methodology and materials specific attention needs to be given to e-learning, life-long learning and internationalisation. In addition, the RPWDE section is actively working on the development and improvement of her own education portfolio that include the courses Ports and Waterways 1 (CIE4330) and 2 (CIE5306), River Engineering (CIE4345) and River Dynamics (CIE5311).

Research
The professor is expected to do research in his or her own field of specialization, supervise the research of PhD-candidates and other members of the group, and initiate new areas of research within the broader domain. Research topics can therefore range from port master planning to automatic sailing vessels to the interaction between ports and cities, and port design and maintenance of fairways. Having an overview of research within the faculty of CEG, as well as in other faculties, the professor is expected to initiate multidisciplinary research and to connect engineering practitioners with scientists. The responsibilities will also include to maintain and enhance the relations with other research groups worldwide, and in particular with financing agencies and industries (public and private). Therefore, he/she has a good publication record in peer-reviewed journals, experience with obtaining externally funded research projects and a good knowledge of and connection with new developments in the sector such as smart/flexible/sustainable ports. The candidate has experience in supervising and guiding groups of engineers or researchers in his or her field.

Services and valorisation
Because of the large impact of hydraulic engineering on society it is expected that the professor will play a role in the cooperation of the university with multi-disciplinary teams in engineering practice and other academic institutions worldwide. New developments in the field of ports and waterways are often found in actual projects associated with e.g. Port of Rotterdam and Rijkswaterstaat. Therefore the professor is expected to be involved in and provide expert advice in innovative developments in projects in the Netherlands and abroad through positions in boards and (review) committees or through direct interaction with contractors and engineering firms.

Also, international fora and networks are important for the group and the department. The professor is expected to represent the university in networks such as COPRI (ASCE’s Coasts, oceans ports and rivers institute), PIANC (the World Association of Waterborne Transport Infrastructure) and IAHR, (International Association of Hydro-Environment Engineering and Research).

Management
The professor will have the task to manage his/her own group, is expected to participate in the management of the department, and may be asked to also participate in management tasks at the level of the faculty or university.
2.2 Profile of the candidate
The successful candidate has a PhD or comparable portfolio in Civil Engineering or a closely related field, has a high level of expertise in ports and waterways, has a drive to innovate through research and has the capacity to communicate effectively in both Dutch and English.

The candidate should preferable meet the following criteria:

1. A broad experience in the field of ports and waterways, related infrastructure and logistics. This preferably includes experience with the (stakeholder inclusive) design and execution of large innovative and/or sustainable port developments;
2. Given the focus of the HE department the candidate should be able to connect his/her research and teaching with other fields of expertise, such as hydraulic structures and the management and modelling of rivers, coasts and estuaries;
3. A strong track record in research on ports and waterway engineering, logistics and management, as demonstrated by a PhD ‐thesis or comparable portfolio, other high quality scientific publications, a personal involvement with research and a clear vision on future developments in research in the field. Projects and publications should be of high scientific quality and practical relevance;
4. A great affinity for education and educational innovation. Having a clear vision of future developments in (engineering) education in general and in the field of ports and waterways in particular;
5. Excellent teaching qualities, with an enthusiasm for, and a large interest in, teaching younger generations of hydraulic, coastal and river engineers, as demonstrated by personal experience with knowledge transfer and dissemination;
6. Strong leadership skills, focussed on the supervision of academic professionals and leading of research teams and projects;
7. The candidate should have a very good national and international network in the sector, which covers the industry, government and scientific world;
8. The candidate should have the capacity to communicate effectively in both English and preferably also in Dutch.
9. In the Netherlands applied research is usually carried out in close cooperation with partners from industry, government agencies and other universities. The professor of Ports and Waterways is expected to play a leading and integrating role in the profession in the Netherlands and internationally.
10. Since the Ports and Waterways group uses knowledge of different disciplines within Delft University it is expected that the professor has a strong competence regarding connecting people.

3. Appointment size and duration
The position concerns a part‐time chair with a size of 0.3‐0.4 fte. This is seen as the minimum to allow the chair holder to create substantial impact and to further the field of research. The duration of the appointment is envisaged for 5 year with possible extensions and re‐appointments.