



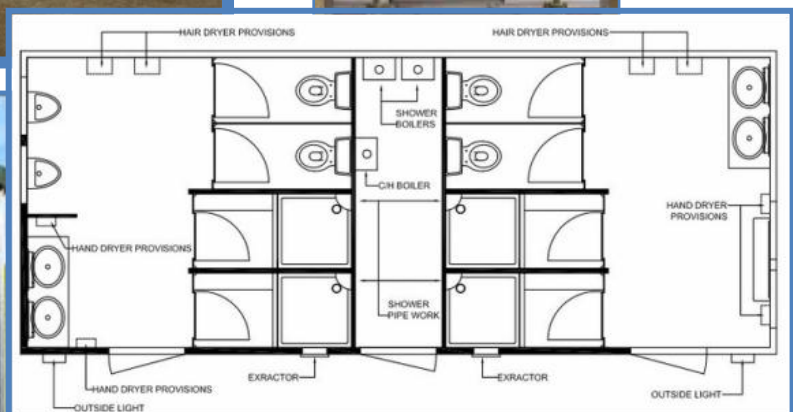
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Draft Design Guidelines for Toilet and Shower Facilities for the Cool Route



May 2017

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Executive Summary

The Cool Route Gap Analysis was undertaken by GCU to point out the existing gap elements of the route, both in spatial and infrastructural terms. The evidence deriving from the study suggests the existence of potential intervention to augment and, in some cases, develop new facilities such as toilets and showers at several locations along the Cool Route.

In order to provide with practical recommendation both individual marine operators and public organisations, a set of guidelines are offered through the course of this document. Thus, three types of design have been developed in order to suit different standards and financial requirements expected to be dissimilar across the interested groups: *Basic, Mid-range and Top of the range*.

Elements looking at the accessibility for disabled individuals to the facilities and the sustainability aspect (materials used, energy sources, lighting, chemicals utilised) have also been taken into consideration.

1. Purpose of this document

Glasgow Caledonian University is the Scottish partner of the Cool Route responsible for the Work Package 3 related to the: Logistic Plan, Technical Design and Safety and Logistics.

The Gap Analysis highlighted the absence or limited presence of guest infrastructures and services identifiable with toilets and showers, particularly in remote areas or stopovers, typically moorings, but in some cases also for pontoon and harbour-type of stops along the route.

The aim of this document is to establish a set of guidelines on the layout and provision of toilets and showers and provide with a blueprint that can be applied at the different locations identified. We have aimed at recommending different types of standardised designs and solutions which would be fast to have in place, but also something that would have a generic design for planning permission in the various regions part of the route.

During conversations with associate partners at the Stakeholders' Meeting held in Derry on 25th October 2016, what emerged was the need for standardised facilities design. Optimistically, stopovers comprising facility gaps- identified through the Gap Analysis- will benefit from the present study in terms of fund raising, by attracting local investments, and overall facilitating build the case for improving their facilities. For these reasons, this document has the scope to provide pricing and design options for adaptable toilets and showers facilities which can be implemented by different stakeholders and operators in all areas of the project.

1. Methodology

It is worth reviewing that a *Facility gap* was previously identified in the event facilities such as toilets and showers were not found ashore or in the immediate proximity of the landing stop. Three are the scenarios that occur to create a facility gap along the Cool Route at a specific location:

- i. A gap exists where NO toilet or showers are available
- ii. A gap exists where there are NO showers but toilets are available
- iii. A gap exists where NO toilets are available but showers are instead
(this is merely a hypothetical situation although it has never been found in the study)

A facility gap has been also identified where, either one of the two services was unavailable within one mile from the landing point.

For the purposes of this study, a practical approach has been adopted by reviewing best practices and industry examples in regard to toilets and showers provision in the area of marine businesses but not limited to this. The review has focused on portable toilets and showers as these have been identified as the most suitable for the project's scope. In fact, quick connection on site, flexibility, wide range in size, the multiplicity of features and cost solutions along with generally low maintenance and associated costs characterise this type of solution.

Firstly, desk research has been conducted by reviewing portable toilets and showers blocks suppliers based in the U.K. territory. Leisure and outdoor activity related providers of toilets and shower blocks for camping sites, outdoor events and other activities have been reviewed. Secondly, the providers of such solutions have been contacted by email and telephone in order to confirm the preliminary findings and gain complimentary information from practitioners in the sector. A total of 16 suppliers have been contacted. Quotes and drawings have been compared in order to develop the blueprint for the study.

2. Facilities Blueprint

In order to provide a solution suitable to different operators at different locations, we developed three types of design to meet different criteria and financial budgets expected to vary across the interested groups:

- 1. Basic**
- 2. Mid-range**
- 3. Top of the range.**

These solutions will be described in the following sections of this chapter. All prices do not include VAT, shipping costs or any other cost associated to installation, plumbing or wiring.

2.1 Solution no.1: Basic

A basic option will suit those locations where a limited level of investment is expected. Options for both toilets and showers blocks have been provided individually; finally an option that combines both the toilet and shower service in one block is presented.

The first option is given by **portable toilets** which have no water connection and use chemicals instead. These toilets need to be placed on solid level service where access can be made using a service truck. Regularly these toilets need to be pumped out using a vacuum tank usually placed on a service truck. Although this solution represent an easy option which does not require any type of wiring/ piping work, it still requires to be serviced regularly. The price ranges between £600 and 1,200.



Figure 1. Portable toilet without water connection

An alternative to the above is offered by a 'compost' toilet that features a diversion system which does not use any water. It is ideal for locations without access to a sewerage system or that have a lack of water. The walls and roof of this toilet are made out of Wood Plastic Composite (WPC) making the toilet resistant to extreme temperatures either high above or below zero, high winds and UV exposure increasing the buildings longevity and endurance. This solution can stand independent from outside electricity supplies due to the solar panel on the roof feeding both an electric water pump and powers a 12V light. The cost for this solution can be found on the market for £1,200. A picture of this alternative can be found below.



Figure 2. 'Compost' toilet with solar panel

The following option consists of a steel portable toilet that features a porcelain toilet and sink, hot water boiler and electric heater as well as electric ventilation. This type of solution requires water connection as it utilizes fresh water instead of chemicals.

Different sizes are available on the market, typically as follows:

- Single Toilet 1200mm x 1400mm x 2500mm
- Double Toilet 2400mm x 1400mm x 2500mm

Steel portable blocks' prices range from approximately £1,650 + VAT for a single toilet up to £3,500 + VAT for a double toilet. Features such as extractor fan, water heater, frost heater and electrics, lighting and aluminium checker plate floors, soap dispensers and any optional consumables-replenishment service clearly impact on the overall cost.

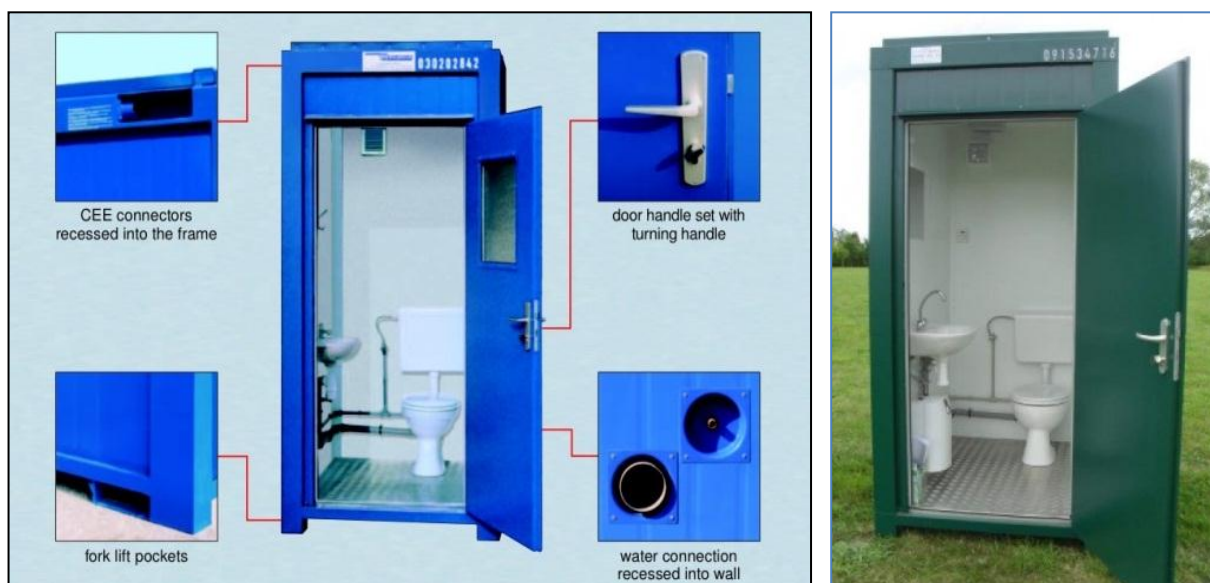


Figure 3. Basic option: toilet block

A solution for a single portable toilet and an additional one suitable for disabled people is also provided (Fig. 2). This solution includes an access ramp, a disabled toilet with disabled alarm system, sink, and water heater. The cost associated ranges from £4,650 to £7,000 + VAT.



Figure 4. Single toilet and disabled toilet solution

A solution made of timber is available as shown in picture 5 which includes 2 fully equipped gents' toilets and 1 ladies' toilet with sink, hand wash and mirror. The cost for this solution is approximately of £3,000.



Figure 5. Steel Portable Toilet 2+1

In terms of **showers**, a basic solution for portable showers ranges from £3,000 to £6,000.

A two cubicle unisex shower unit with sink and hand wash facilities is shown in Figure 6. Bespoke solutions are offered to suit individual requirements or energy preference (electricity, gas, or oil).

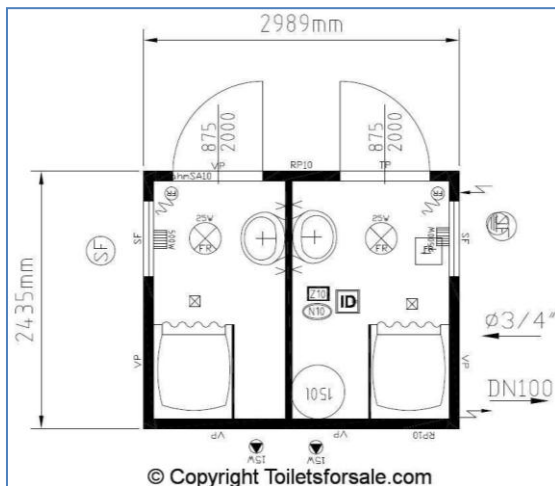


Figure 6. Unisex shower unit

A **combination of toilets and showers** is also offered at a price of averagely £3,500.

This solution merely requires mains connection to an external water supply and the facility to discharge into a main drain or external holding or septic tank (Fig. 7)



Figure 7. 8ft Steel Cabin with Portable Toilets & Showers

A different option is offered below, consisting of 2 + 1 portable toilets and showers from £ 4,950 + VAT.



Figure 8. 16ft x 9ft 2+1 + showers and washrooms

This (Fig. 8) all steel 16ft x 9ft solution contains: a ladies' toilet and hand basin, hand wash heater, hand drier; a self-contained shower room with electric shower, bench seating; 2 gents' cubicles, 2 urinals, 2 hand basins, hand wash, heater and vinyl flooring.

Another viable solution in this range is given by the following one (Fig. 9) which features two toilet and shower rooms including disabled access for £11,250.

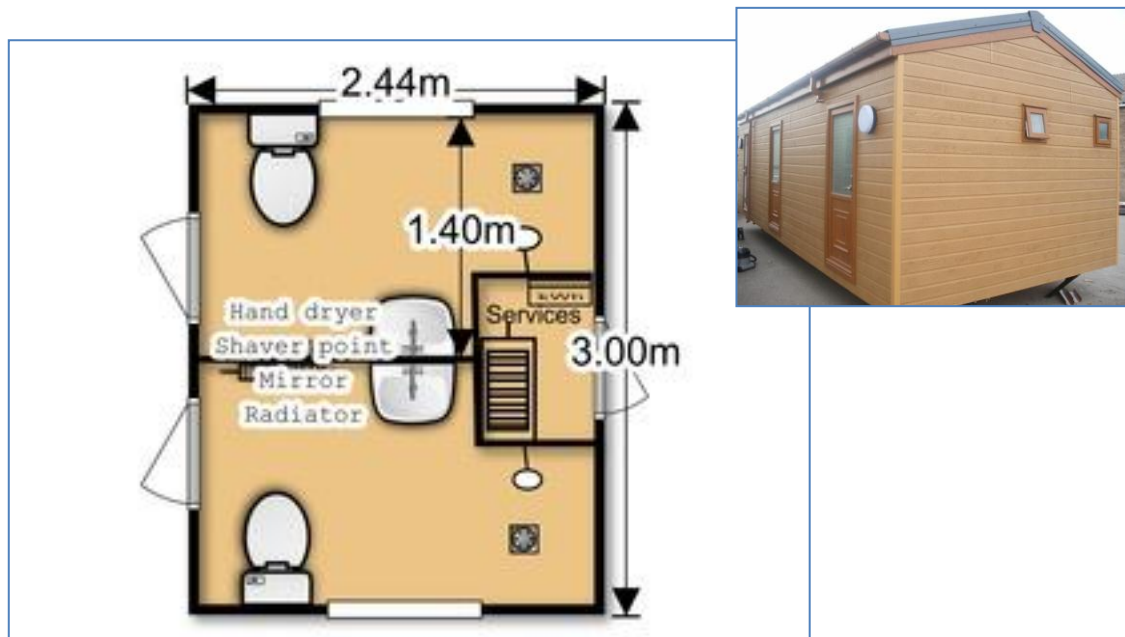


Figure 9. Unit with 2 fully equipped bathrooms

This small unit features two complete bathrooms, each with a shower, toilet, washbasin, mirror and heater.

2.2 Solution no.2: Mid-range

The second range of solutions is constituted of portable units characterised by larger dimensions. These solutions are ideally suited for longer term installations. They are free standing on level ground and merely require mains connection to an external water supply and the facility to discharge into a main drain or external holding or septic tank. Providers can usually design these according to specific requirements and in different sized buildings up to 13m in length and 3m in width.

The first option considers a block of male and female toilets and washbasins for £ 7,750.



Figure 10. Block of male and female toilets and washbasins

The second option considers a block of male and female toilets and washbasins and also a section for people with disability for £ 10,925.

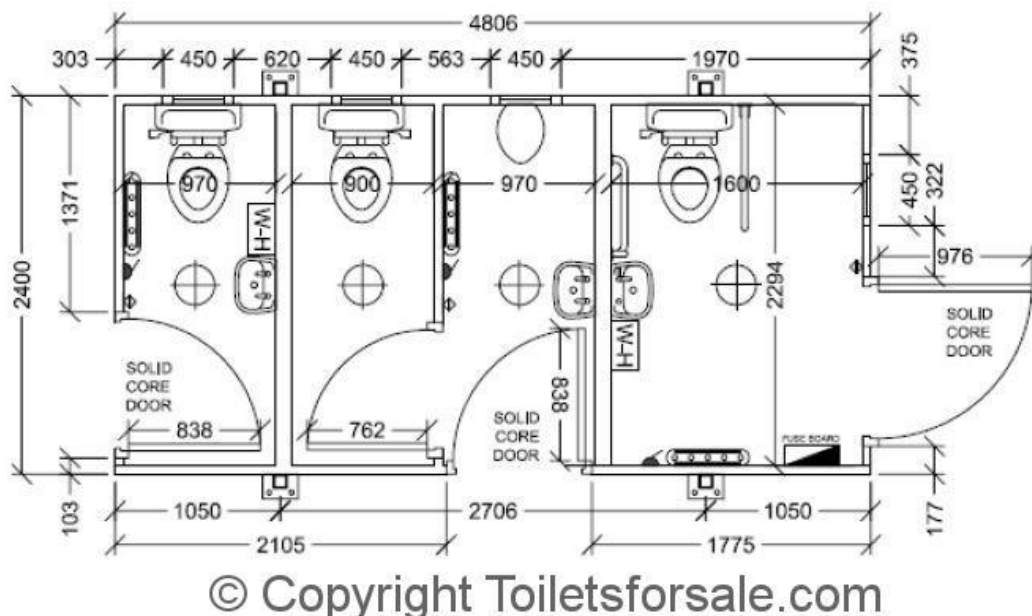


Figure 11. Block of male and female toilets and washbasins with additional impaired mobility access

When looking at showers and toilets combined solutions, we identified suitable portable unisex toilets and showers blocks from £14,325.

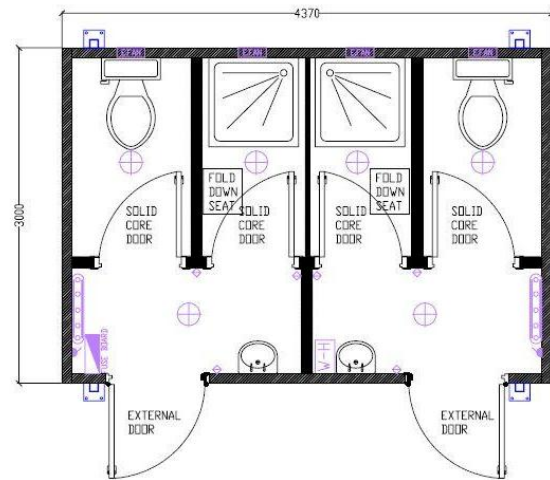


Figure 12. Combined showers and toilets

FLOOR PLAN
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2.3 Solution no.3: Top of the Range

This third range of solutions is formed of portable units characterised by larger dimensions and high-durable materials. A higher cost is associated to this third group. Similarly to the mid-range solution group, these solutions are preferably suited for longer term installations.

The following plan comprises portable toilet and separate shower blocks and includes impaired mobility access. We identified that typically a solution based on this layout and size is available from £ 34,000.

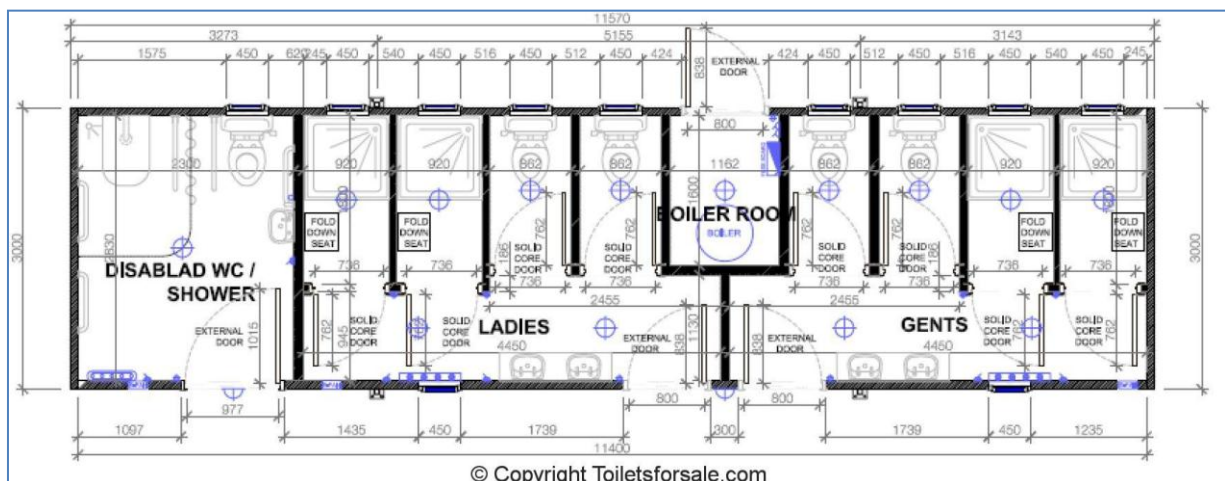


Figure 13. Male/Female/Disabled Toilet and Shower Unit

This specific design features:

- Size (mm): 11570 x 3000
- Male: 2 x shower cubicles/2 x hand basins / 2 x WC's
- Female: 2 x shower cubicle/2 x hand basins / 2 x WC's

- Disabled: 1 x shower/1 x hand basin /1 x WC

3 Waste management

Due to the nature of marine landing locations and also of the project itself, some of these locations are situated in remote areas or locations difficult to access such as islands, lochs or fiords. Waste management can be an issue for businesses even in easy to access areas, so adding remoteness to the equation requires alternative solutions.

These solutions must also consider the environmental impact they may have. Here we are presenting some of the solutions already available in the market which present a reduced impact on the environment as compared to traditional dumping solutions.

3.1 Compost toilets

There are two types of composting toilets:

- Urine diverting: it separates solids and liquids at source.

By separating out the urine the composting toilet reduces the waste volume by 80%. The toilet collects the solid waste but due to its dry nature, this is too dry to break down; therefore it must be removed and composted in a compost bin.

- Non-diverting urine: this means that the waste has enough moisture and Nitrogen to break down the compost in the unit.

Some of these units may require a fan to extract the composting gases, and that means a connection to a power source.

The cost of the different units depends on the quality of the build. These can be fixed or portable as required. Composting toilets are relatively easy to manufacture and are being used in remote communities in developing countries (see social enterprise Toilets for People <http://toiletsforpeople.com/>).

Some examples are provided below.



Figure 14. Urine Diverting – Self Contained (requires power source for the fan).

A solution of this type is expected to be in the cost range: £665 or €796.



Figure 15. Internal composting – Self-contained (requires power source for the fan)

A solution of this type is expected to be in the cost range: £1,995 or €2,389



Figure 16. Non electric – Urine diverting – Self-contained composting solution

While the first two solutions require a power source to function, the example in Figure 16 does not require any instead. This one is probably the most adequate solution for a frequent use, but will require separate composting facilities. The cost may range around £750.

3.2 Portable holding tanks

There are companies that provide services including portable toilets with attached holding tanks. These tanks have different capacities: 300, 750, 1,000 or 1,500 gallons and require being changed or emptied when full. On one hand, the advantage of this solution is that can contain large amount of waste before being in need to be emptied. On the other hand, the negative aspect is the sustainability and the potential cost of this being transported to be evacuated to another location.



Figure 17. Example of a portable toilet with a holding tank

If the tank is expected not to be used regularly, there are lighter versions designed for portable domestic use (for example camping or marine use). Tanks capacity can range from 11 gallons (42 litres) to 36 gallons (137 litres).



Figure 18. Example of a 29 gallon portable holding tank

3.3 Incinerating toilet

This type of toilet requires a reliable source of power supply and ventilation. The unit incinerates waste (45 minute programme for solids or 10 minute programme for urine) and leaves ashes that can be used as compost. Each burning cycle requires a 60 minute cooling period. The estimate is that it can be used by 3 people per incinerating cycle.



Figure 19. AC electric – incinerating – self-contained

Prices for this solution are found to be around £3,250.

3.4 Deep Freeze toilet

This type of toilet can be installed anywhere, it does not require ventilation but it does need a reliable power source. It works like a home freezer; the urine and solid waste, as soon as they reach the base of the toilet are frozen, eliminating any odours. They are collected in the compostable bag and can be easily disposed of. It is portable and is ready to use in 30 minutes after being plugged in.



Figure 20. Example of deep freeze toilet.

Prices for this solution are found to be around £1,500.

3.5 Bio-Gel/Digesters

In the case portable toilets are used, there are two main alternatives to transport the waste or dispose of it:

- Bio-gels: can be added to the waste to solidify it into a safe and odourless product. Then the waste can be easily transported and disposed of. The bio-gel is biodegradable. Bio-gel is relatively cheap (approx. £8 per pack) but this still requires the management of the waste.
- Waste digester: this is a dry powder that breaks down human waste and even toilet tissue. It can be added to holding tanks before or after use.

3.6 Solar and wind energy

Many of the suggested options require a source of power. When this is not viable or the purpose is to find alternative sources, solar and wind energy packs are widely available in the market. Solar power panels are available for as little as £60, but the main cost is represented by the battery. Wind turbines could be the most appropriate solution for a marina, although they are more costly than solar panels with an approximate cost of £700.



Figure 21. Example of portable wind turbine

4 Discussion

Overall, the present study supports a basis for raising engagement and potential development opportunities in the locations where the facility gaps have been identified.

The feature and price ranges offered are believed to provide practical guiding principles to the wide range of marine operators involved in the Cool Route.

To conclude, a few limitations associated to the document include the following points:

- Companies that have been contacted are UK and Ireland based. No organisation based in the countries part of the Cool Route rather than the U.K and Ireland has been included here. Although this was mainly driven by language barriers, it also restricts the research scope to specific geographical areas. Further investigation of local providers (Norway and Faroe Islands) could be taken into consideration during the course of the project.
- A definitive indication of possible discounts for group purchases have been difficult to obtain, although, indicatively, it is imaginable to expect a reduction of costs up to 10-15% for orders of 5 or more units.

Sources

A vast selection of company websites of providers has been reviewed for the production of this document. Among the main sources used:

<http://www.site-equip.co.uk/> (Fig. 1)

<http://dunsterhouse.co.uk/composting-toilet> (Fig. 2)

<http://www.toiletsforsale.com/> and <http://www.portablespace.co.uk> (Fig. 3)

<http://containercabins.co.uk> (Figs. 4 and 5)

<http://www.toiletsforsale.com/> (Fig. 6)

<http://containercabins.co.uk> (Fig. 7)

<http://www.angloscottish.info/> (Fig. 8)

<http://www.arch-house.co.uk> (Fig. 9)

<http://www.toiletsforsale.com/> (Figs. 10, 11, 12 and 13)

Other sources

<http://www.arch-house.co.uk>

<http://www.shippingcontainersuk.com>

<http://www.euroloo.com>

<http://www.adarestroomtrailers.com>

<http://www.cleanwaste.com/>

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<https://www.stadiumpal.com/product/bio-gel-waste-gelation-solution-for-human-waste/>

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<https://www.dometic.com/en-gb/uk/products/hygiene-and-sanitation/sanitation/holding-tanks>

<http://www.eco-toilets.co.uk/eco-toilet-info/why/>

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<http://www.letsogogreen.com/residential-composting-toilets.html>

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<http://windpax.com/>