ECI 1A Package Plants

providing Uiscé Éireann with additional flexibility in addressing water compliance issues and production shortfalls during upgrade works

by James McKenzie & Divya Prasher

Uiscé Éireann's Early Contractor Involvement (ECI) Programme was established in 2019 with the aim of delivering numerous water infrastructure projects nationwide in a more collaborative and cost-effective manner up to and including the year 2025. The Package Plant Project was a part of '1A' region located in the southern half of Ireland and required the fabrication of a number of package (mobile) water treatment plants (PWTPs), which could be easily and quickly deployed at existing water treatment plants where treatment issues had become a problem allowing Uiscé Éireann to provide safe water to consumers. Glanua Ltd is the main contractor for ECI 1A projects.

Package water treatment plant at Glanua's manufacturing yard - Courtesy of Uiscé Éireann

Treatment plant selection

In order to allow the Uiscé Éireann to address the majority of potential issues that could arise, a rigorous review was undertaken to understand the type and size of plant that would be required. These plants had to be able to produce compliant water in, most likely, challenging conditions but also be adaptable enough for quick deployment into various existing sites with access issues and limited room to accommodate the plants.

This review put the following PWTPs forward for design and manufacture:

Unit Name	Unit Type	Flow Rate
DAF50	Mobile DAF/flocculation tanks & filtration	Treated water 50m³/hour
AC50	Absorption clarifier & filter	Treated water 50m³/hour
AC25	Absorption clarifier & filter	Treated water 25m³/hour
DAF100	Mobile DAF/flocculation tanks	Settled water 100m³/hour
F100	Filter unit	Filtered water 100m³/hour

Project aims

The main drivers for this project were to provide Uiscé Éireann with additional flexibility in addressing water compliance issues, deficits in production capacity, and production shortfalls during upgrade works.

Detailed project scope

The overall expected requirements included a general arrangement drawing of each plant, a standard control philosophy and a typical startup/deployment plan. Additionally, a spares schedule was required for two years of normal operation, along with a schedule of departures from Uiscé Éireann specifications and standards, as well as a plan for decommissioning and disposal.

The general scope items applicable to all plants comprised a control panel for each plant, a generator cable termination panel to facilitate connection to a temporary standby generator to the sub-main distribution board, general lighting, permanent information plates, and noise level not to exceeding 80 db at a distance of 1m.

Compatibility: In order to allow the package water treatment plants to be compatible for different sites with varied raw water quality, the plants had to include provision of all necessary integration and quality assurance instruments for the specific treatment processes. The designs included:

- Chemical dosing to include an acid, base and coagulant as standard, tailored to suit the needs of each PWTP.
- Eye wash stations and carrier water supply points for each chemical dosing asset.
- The Deployment Plan included details on the requirements for a safety shower in each chemical delivery area.

Relay of signals by telemetry to Uiscé Éireann: Telemetry equipment was included for the collation of the PWTPs signals associated with electrical distribution equipment and all instrumentation, which can be relayed to an off-site central SCADA system.

Weights & lifting arrangements: The weight of the complete PWTP (wet and dry) and the heaviest individual maintenance and erection are stated in the design, along with details of lifting points and appropriate procedures for components weighing over 25kg.

Maintainability: All components that require regular inspection, cleaning or maintenance are readily and safely accessible and, where appropriate, easily replaceable. If any components required planned maintenance, a permanent means of access (e.g. platforms, stairways, fixed ladders) were provided to allow safe access to these components. The selection and design of the permanent means of access complied with the relevant parts of BS EN ISO 14122.

Lagging & trace heating: All pipework and associated components/ systems that are susceptible to their contents freezing, were provided with lagging and/or trace heating. Protection allowed for ambient temperatures of minus 10°C.

Corrosion protection: All process tanks were manufactured from stainless steel. Tank reinforcement and stiffening features were external and all metal fabrications (including pipework, valves and fittings) were designed and assembled to avoid galvanic corrosion. Any galvanising complied with BS EN ISO 1461.

Structures: Support structures were a robust design and braced to ensure rigidity under all operating conditions. These structures were constructed from corrosion resistant materials or protected against corrosion by the application of paints or protective coatings.

Performance criteria & testing

Each type of unit had to meet specific performance criteria to allow the plants to deal with the majority of raw water conditions and produce compliant water as shown below:

Dissolved Air Filtration Criteria		
	95%ile	**Raw water average**
Clarified turbidity	< 1 NTU	10 NTU (max. 25)
Filtered turbidity	< 0.2 NTU	< 1 NTU
Colour	< 20 hazen	50 hazen (max. 250)
TOC	< 2 mg/l	7 mg/l (max. 15)
UVT	> 90%	75% (min. 60%)
Adsorption Clarifier Criteria Water Quality		
	95%ile	**Raw water average**
Clarified turbidity	< 1 NTU	7 NTU (max. 20)
Filtered turbidity	< 0.2 NTU	< 1 NTU
Colour	< 20 hazen	15 hazen (max. 100)
TOC	< 2 mg/l	3 mg/l (max. 7)
UVT	> 90%	85% (min. 70%)
Hydraulic Loading		
Clarification	≤ $20m^3/m^2/hr$	
Filtration	≤ $10m^3/m^2/hr$	

PWTP under construction - Courtesy of Glanua Ltd

PWTP being loaded for delivery to site - Courtesy of Glanua Ltd

PWTP being loaded for delivery to site - Courtesy of Glanua Ltd

PWTP ready for deployment on-site - Courtesy of Glanua Ltd

Testing: Factory Acceptance Tests (FATs) were carried out on each unit post-production in April 2024. Representatives from Uiscé Éireann and Glanua witnessed all units meeting the relevant acceptance criteria during the testing. After the successful FAT tests, the PWTPs were ready to be deployed at active water treatment plants or supply plants as required.

ECI 1A package plant key participants & project schedule

- **Client**: Uiscé Éireann
- **Main contractor**: Glanua Ltd
- **Project management & technical assurance**: AtkinsRéalis
- **Main designer & suppliers**: Glanua Industrial Ltd

- **September 2022**: Design contract issued.
- **December 2022**: Manufacturing contract issued.
- **September 2023**: Commissioning.
- **December 2023 - April 2024**: FAT Testing.
- **June 2024**: Deployment of the first DAF100 mobile package plant to Jones Bridge WTP.

Case study: Jones Bridge WTP

At the time of writing (May 2025), a number of the package water treatment plants have been successfully deployed; the first being a DAF100 unit at Jones Bridge WTP in Clonakilty, Co. Cork.

The need for the PWTP: Jones Bridge WTP produces approximately 400m^3/hour of treated water, serving around 20,000 people. An ECI project was carried out from mid-2022 to March 2025 to upgrade the outdated infrastructure and to make this old plant resilient to withstand the increasing demand in the area.

During the construction of this project, the site team encountered obstacles in undertaking a critical scope item; namely the upgrade of the clarifiers including replacement of tube settlers. These clarifiers have two cells, each with an output capacity of around 100m^3/hr. A shutdown of a single clarifier at a time was required, with 4-6 weeks programmed to upgrade each clarifier cell.

Due to the excessive plant demand, Uiscé Éireann Operations were unable to accommodate the loss of this clarifier for the requested duration, so it was agreed that the works could only be progressed if an alternative treatment process could be utilised; ensuring that the treatment plant maintained its output of 400m^3/hour and minimise disruption to the customers.

Integration with existing works: A DAF100 package water treatment plant was selected to provide the required redundancy. To allow for its transportation by lorries from Navan, Co. Meath, the unit had to be dismantled into three parts and then be re-assembled on site.

The installation of the unit on the site presented difficulties, as it needed to be positioned between the current clarifiers and the existing chemical building. It was necessary to position the DAF unit on a bespoke, elevated frame which required a crane to lift and carry the unit over the existing buildings; so there was no scope for any mistake.

Water from the flash mixer on site was routed into the unit before returning to the on-site filters. Additional connections to the main plant residuals treatment facilities allowed for the temporary plant to fit in seamlessly with the existing plant.

Once in place, the DAF100 PWTP ensured that the plant achieved an output of 400m^3/hour and the upgrade works could start on the existing clarifiers.

Achievements: The unit provided support for 11 weeks (July 2024 to October 2024) during the upgrade works to two of the existing clarifiers, plus an additional week for the trial period. It provided

PWTP being deployed on site - Courtesy of Glanua Ltd

DAF100 unit being deployed at Jones Bridge WTP - Courtesy of Uiscé Éireann

PWTP leaving the Glanua manufacturing plant - Courtesy of Glanua Ltd


DAF100 arriving on site - Courtesy of Glanua Ltd

treatment of approximately 175 MLD of water and helped maintain uninterrupted water supply to 20,000 people.

By end of October 2024, the DAF100 unit at Jones Bridge was decommissioned from the site and sent to Goatenbridge WTP in Co. Tipperary, where it was utilised to allow the completion of another significant upgrade project.

Lessons Learnt and Future Plans

As with any new equipment there were lessons to be learnt. These lessons are being gathered through each deployment to share with future deployment site teams. Throughout 2025, there are plans for deployments of the package water treatment plants at various sites in Co. Donegal and Co. Clare. The key lessons learnt included:

- During PCI stage, identify whether a temporary plant needs to be included as part of the project.
- The roles and responsibilities of all parties need to be documented and agreed in advance.
- Spare components recommended to be held at all times.
- Fully understand and document the operations (O&M Manual) of the existing plant.
- Fully design the integration of the temporary plant into the existing plant.
- Calibration certificates for equipment need to be valid and current.
- Safety inspections to be carried out and recorded.
- Elevation of the unit to use gravity instead of additional pumping.
- Access to raw water during the pre-commissioning and overall commissioning.
- The Deployment Plan should be updated to suit specific site conditions.
- The DAF100 unit could only handle incoming raw water high turbidity of 25 NTU.

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F100 mobile package water treatment plant installation at Goatenbridge WTP - Courtesy of Uiscé Éireann