The Sizewell C Project

8.4 Planning Statement
Appendix 8.4K: Site Water Supply Strategy

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For review and comment

EDF (SZC) NNB GEN Co

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Glossary

ACA	Ancillary Construction Area
BYLOR	Bouygues/ Laing O'Rourke (Joint Venture)
CBGM	Cement Bound Granular Material
CDM	Construction (Design & Management) Regulations 2015
CDO	Combined Drainage Outfall
CFA	Continuous Flight Auger
CFTRVO	Cold Functional Testing Reactor Vessel Open
CMC	Controlled Modulus Columns
DCO	Development Consent Order
EA	Environment Agency
ECI	Early Contractor Involvement
EDF	Electricité de France
EPR™	Trade name for reactor type proposed for SZC
ESW	Essex and Suffolk Water
EW	Enabling Works
FPT	Flushing and Partial System Testing
HAE	Main Site Office
HAJ	Sewage Treatment Plant
HAW	Main Project Office
HDPE	High-Density Polyethylene
HFT	Hot Functional Testing
HOM	Potable Water Storage Facility
HOR	Raw Water Storage Building
HOY	Raw Water Storage
HPC	Hinkley Point C
HPT	Hydrostatic Pressure Testing
IDT	Integrated Design Team
MCA	Main Construction Area
NB	Nota bene
nPW	Non-potable Water
NCC	Nuclear Circuit Cleaning
NNB	Nuclear New Build
NWG	Northumbrian Water Group
RPV	Reactor Pressure Vessel
SEI	Storage & Supply of Industrial Water
SEG	Storage & Supply of Diversified Cooling Water
SEP	Storage & Supply of Potable Water
SSSI	Site of Special Scientific Interest
STP	Sewage Treatment Plants
SZA	Sizewell A
SZB	Sizewell B
SZC	Sizewell C
TBM	Tunnel Boring Machine
TCA	Temporary Construction Area
WBS	Work Breakdown Structure
WINEP	Water Industry National Environment Programme
WMZ	Water Management Zone
WRZ	Water Resource Zone

Executive Summary

This water supply strategy report describes the water demand for Sizewell C Nuclear Power Station (SZC) throughout the construction phase as well as commissioning and operational phases. It also identifies the strategy for supplying the water, for both potable and non-potable water requirements.

It is acknowledged that water is a finite resource and therefore every effort should be made to reduce the requirement for potable water, through recycling water, and using other forms of acceptable quality non-potable water in place of potable where possible. This water supply strategy report identifies the areas where water recycling can occur and also where non-potable water can be used to enable a realistic whole of life demand profile to be produced.

The potable water demand curve identifies three main peaks during construction, and then additional, more consistent peak demands when the power plant is operational. A summary of the critical potable water demands is set out below, and summarised in a graph within and appended to the report.

- September 2023 – Approximately 1,000m^3/day peak
- August 2024 – Approximately 2,600m^3/day peak
- April 2027 – Approximately 4,000m^3/day peak
- June 2034 – Approximately 2,800m^3/day peak during outages.

The above peak values include an allowance for recycling of water and use of non-potable water for various construction activities.

Water supply for SZC is also discussed in this report. The local water resource zone (Blythe WRZ) is known to be lacking in spare capacity and therefore is not able to supply SZC with the outlined potable water demands. Discussions with Northumbrian Water Limited (NWL) have identified the opportunity to provide a connection from a separate water resource zone (Northern/Central WRZ) which may contain spare capacity to supply the peak demand of 4,000m^3/day to SZC subject to completion of NWL's part of the Environment Agency led Water Industry National Environment Programme (WINEP) study.

To allow the transfer of this potential spare capacity, a new potable water transfer main is required from Barsham to Sizewell C, as well as some network upgrades. NWL have indicated that subject to the spare capacity being confirmed, they should be able to supply Sizewell C's peak construction demand of 4,000m^3/day, but not until December 2024 at the earliest, and there is significant programme risk around this milestone. A connection of 2,000m^3/day from July 2026 and 4,000m^3/day from December 2026 is therefore assumed for the purpose of this water supply strategy, which NWL consider to be realistic. NWL has identified June 2028 as the latest credible date that the transfer main would be fully available. The strategy therefore allows for installation and retention of a temporary desalination plant until this date, or later if required, to mitigate the programme risk around delivery of the transfer main by December 2026. The temporary desalination would be decommissioned before commencement of the operation of Sizewell C nuclear power station.

Because of the phasing challenges discussed above, the provision of water to the site is proposed across three separate phases:

- Phase 1 – October 2022 – January 2024 – Water provided through trucks
- Phase 2 – October 2023 – December 2026 – Water provided through local temporary desalination plant on site. The end date aligns with the proposed availability of NWL's transfer main, however this phase can be extended as required until such time the NWL transfer main is fully available.
- Phase 3 – December 2026 onwards – NWL transfer main.

The strategy provides for continuous provision of potable water throughout the design life of SZC, from early construction to operation. There is overlap between Phase 1 and Phase 2 to allow for programme risk of the desalination plant, and an ability for Phase 2 to extend further until the NWL transfer main is fully available.

Non-potable water supply is also considered for suitable construction activities such as irrigation, dust suppression, vehicle washing, etc. In order to reduce the amount of potable water used, a number of non-potable water supply options are considered and addressed. These include:

- SZB treated foul water

- SZC treated foul water
- Existing licences currently used for irrigating crops within the order limits that will not be required during construction.

Storage of non-potable water is also provided for within the order limits, so that supply during winter months can be stored and used in the higher demand summer months.

Note

SZC Co. is aware of NWL's most recent letter to the EXA dated 24 August, which suggests that NWL may have difficulty supplying water to SZC, even in the longer term, based on its current capital investment programme. Its letter raises issues which affect the availability of sustainable supply across the whole of the East of England and which, if confirmed, will require a strategic response by the water company in order that it can continue to fulfill its water supply duties under the Water Industry Act for Sizewell and elsewhere, including its duties under both sections 41 and 55.

SZC Co. is aware that the position is still the subject of the continuing studies and that no conclusions have yet been reached by NWL or by the Environment Agency. SZC Co. is engaging both parties on the continuing work and its potential implications and will continue to keep the examination updated. Longer term plans will need to be put in place to serve the region and its committed growth.

SZC Co.'s Water Supply Strategy preempts any risk for the duration of the construction period, allowing considerable time for longer term outcomes to be examined by all stakeholders.

SZC Co. is aware that there are a range of long term options open to NWL in discussion with the Environment Agency, in order to meet its supply obligations, including the current or alternative options for a transfer main, sustainable abstraction, waste water recovery, desalination and investment in more strategic water storage and transfer options.

SZC Co. welcomes the commitment from NWL to continue to engage proactively on these issues.

1. Introduction

SZC Co. intends to deliver a nuclear power station designated Sizewell C (SZC) that will make a major contribution to the nation's low-carbon energy needs. The SZC site is located on the Suffolk coast, approximately mid-way between Felixstowe and Lowestoft, to the north-east of the town of Leiston. This area of the country is known to have challenges with respect to water supply and therefore the construction of SZC is required to take this into account for construction and operational water usage.

It is acknowledged that water is a finite resource and therefore as part of the project, the water demand for each activity has been minimised as much as possible, using water recycling methods as well as non-potable water for construction activities where suitable.

The purpose of this report is to expand on the outline strategy submitted with the Development Consent Order (DCO) application and serve as a standalone document to support the DCO examination. The report summarises the overarching water supply strategy for the construction, commissioning and operation of SZC nuclear power station, and provides an updated and integrated water demand profile for the power station that considers all stages of the project lifecycle including:

- Associated Developments.
- Site establishment and construction.
- Commissioning.
- Operation.

The report is split into two sections:

- Water demand summary. This includes water demand inputs and assumptions, differentiates between different construction activities and consumption for welfare, and identifies areas where non-potable water may be able to be used.
- Water supply strategy. This identifies how the site will be supplied with water, both potable and non-potable, as well as detailing other water reduction measures to be used on site and the use of potable and non-potable water storage proposed on site and how these features fit into the overarching supply strategy.

2. Water Demand

2.1. Introduction

This document has been produced to summarise the likely demand for water during enabling works, main works construction, commissioning and operation. This report draws on information from a range of sources, including lessons learnt from Hinkley Point C (HPC) for the majority of the construction activity demands, as well as commissioning and operational demands. This report breaks down the demand for each construction activity, stating the assumptions included in deriving the demand.

The demand summary has been shared with Northumbria Water Limited (NWL – parent company of Essex and Suffolk Water) to define requirements in terms of its supply of potable water for the project.

2.1.1. Project Phases

The following key phases have been factored into this report and demand profile.

- Year 0 – Year 3 – Construction Phase – Early Works
- Year 3 – Year 10 – Construction Phase – Late Works / Main Civil Works
- Year 7 – Year 9 – Commissioning
- Year 10 – Onwards – Operational Phase

2.1.1.1. Construction Phases

2.1.1.1.1. Year 0 – Year 3 – Early Works

Early works carried out at SZC will establish the construction site and install the infrastructure required to enable the main civils works. The key construction activities that are water intensive during the early works include:

- Combined Drainage Outfall tunnel (CDO) construction, a 1.2m diameter, approx. 500m long tunnel construction to allow construction water (including surface water and treated foul water) to be discharged to sea.
- Cut off wall construction.
- Early concrete batching.
- Early welfare demands.
- Ground improvement within the Main Construction Area (MCA) for the SSSI crossing build up and the north-west corner.
- SSSI Crossing – A road bridge across the SSSI area for construction traffic.
- Dust suppression.

2.1.1.1.2. Year 3 – Year 10 – Late Works (Main Civil)

The main civils period includes the majority of construction activities and the increase of personnel on site to deliver the project. The key construction activities that require potable water during the main civil works include:

- Concrete Batching.
- Construction of cooling water intake/outfall tunnels.
- Backfilling the MCA.
- Welfare demands.
- Accommodation demands.
- Dust suppression.

2.1.1.2. Year 7 – Year 9 – Commissioning Phase

The commissioning phase will involve testing the function and performance of individual components, items of equipment, sub-systems and systems, and testing of the overall performance of the reactors in their operational configuration. The commissioning activities include:

- Hydrostatic Pressure Testing (HPT) – Completed by the construction team prior to handover to the commissioning team. This will involve filling the systems with water and increasing the pressure above normal operating pressure to test strength and leak tightness of the systems.
- Flushing and Partial System Testing (FPT) - Completed by the construction team prior to handover to the commissioning team. This will allow the leak-tightness of components not subject to hydrostatic pressure testing (as defined above) to be checked, and will support systems in achieving the appropriate level of cleanliness by removing any foreign matter which may remain in the systems
- Nuclear Circuit Cleaning (NCC) – This is the start of non-active commissioning. During this phase auxiliary systems connected to the primary circuit will be flushed into the Reactor Pressure Vessel (RPV). The aim of the flushing is to clean the main nuclear systems.
- Cold Functional Testing Reactor Vessel Open (CFTRVO) - This phase is when the primary circuit will be tested at temperatures well below those of normal operation, with the vessel head removed, and flow from safety injection systems into the primary circuit will be checked and adjusted.
- Cold Functional Testing (CFT) - This phase is when the primary circuit will be tested in solid-state operation with the vessel head installed. The primary hydrostatic pressure test will be performed, in which the integrity of the primary circuit will be tested by taking the pressure in the system to well above normal operating pressure.
- Hot Functional Testing (HFT) - During HFT, the temperatures and pressures of the primary circuit are increased to close to normal operating conditions for the first time.

The commissioning of both units will take place over a period of 6 years with a 12-month lag between nuclear reactor units 1 and 2 (Units 1 and 2).

2.1.1.3. Year 10 – Onwards – Operational Phase

The operational phase will be commenced once all construction, commissioning and snagging has been completed, signed off and given back to the client to begin full operations. The operational phase demand has been calculated for all activities to run the plant, provided in this report by the client.

Once operational, the potable water (SEP) system will consist of two buried mains that collect potable water from the external water source delivery point on site and supply SEP and SEG tanks located inside the water reservoir (HOR) building. The HOR building serves the Industrial Water (SEI) and Potable (domestic) Water (SEP) distribution systems for the two new European Pressurised Reactor (EPR) units.

The SEP system ensures production and distribution of drinking water to the general services (elementary systems or buildings) of the installations of the conventional island and nuclear island for both Unit 1 and 2. There are 2 SEP tanks with a volume of 300m^3 each and the average daily demand for the SEP is 230m^3/day.

The SEI system at SZC power station will supply potable (raw) water to both nuclear units, particularly for the operating buildings: Turbine Hall, Pump House, Pre-Outfall Structure, Transformers Platform, Auxiliary Boilers Building and the Demineralisation Station. The water is mainly used for the supply of the demineralisation process. The SEI is fed from the SEG tanks. The average daily demand is 1,790m^3/day and the maximum daily demand is 2,640m^3/day.

The Diversified Ultimate Cooling Water Supply System (SEG) is required in emergency situations that may potentially result from the occurrence of extreme external hazards exceeding design basis scenarios.. The SEG system can also be used to provide firefighting capability in other situations than Fukushima type events. The SEG tanks will also act as buffer capacity. There are 3 SEG tanks with a volume of 9,000m^3 each.

The EPR power station will be operational for 60+ years.

2.2. Construction Phase Demand

The following sub sections outline each principal component of demand and how they've been calculated and factored into this report.

2.2.1. Construction Demands – Early Years

2.2.1.1. Combined Drainage Outfall

The Combined Drainage Outfall (CDO) is a temporary tunnel which provides a discharge route to the sea from various water streams during construction. This would include surface water, treated sewage effluent, extracted groundwater, cooling water and commissioning waters. The tunnel would be constructed early within the construction programme, before many of the utilities can be installed in the surrounding area, and may require temporary connections or standalone equipment.

Due to the expected ground conditions, a slurry support system will be required to maintain the bore stability during drilling. For the production of the slurry, around 65m^3 of water per day is required However, based on a methodology for recycling the returned slurry and processing this for re-use, a 30% saving on fresh potable water is assumed, reducing demand to 45m^3 per day. Due to the complex nature of the properties of the slurry to perform various functions, the mix will need to be designed based on the geology of the profile of the tunnel. Potable water is required in order to protect the chemical properties of the slurry and avoid any safety implications for the stability of the bore.

2.2.1.2. Cut Off Wall Slurry Production

The cut off wall will be a continuous diaphragm wall forming a low permeability barrier to the main platform so that the platform can be excavated safely. The wall will be formed of reinforced concrete panels that extend into the impermeable soil layers around 50 metres into the ground. To excavate the wall panels, the bore will need to be stabilised with a slurry.

The essential functions of the bentonite slurry are summarized below:

- Ensure the trench stability.
- Reduce the soil permeability.
- Suspend and transport excavated ground particles (when using trench cutters for example).

The bentonite slurry is pumped into discrete panels as excavation (by grab or trench cutter) is progressing. Once the excavation of a panel is completed, the bentonite slurry must be replaced or treated with a cleaner bentonite slurry.

The bentonite slurry during excavation becomes denser as particles of soils / materials are retained within the slurry. This excavation slurry is not suitable for the remaining activities: a clean bentonite (or new bentonite, or fresh bentonite, or concrete bentonite) with low density is required in order to avoid cakes or soil particles sticking to the joints or the reinforcement (if any).

The water need is assessed at a value of twice the volume of excavation (due to the bentonite in the bore being fully exchanged prior to concreting):

- 60% of that volume is assessed to be reusable due to the different substitution and de-sanding processes, which gives a water need of 75% of the diaphragm wall excavation volume.
- Based on a single diaphragm wall panel being completed per day (per rig), this would require around 375m^3 of water for slurry production. It is expected around 4 panels per day could be completed on average for the purposes of the demand estimate.

As with other slurries, due to the complex nature of the properties of the slurry to perform various functions, the mix will need to be designed based on the geology of the ground being excavated. If the chemical properties are affected this could have safety implications on the stability of the bore, and for this reason potable water is used for this process.

2.2.1.3. Ground Improvement

Around certain parts of the main platform such as the north-west corner within the SSSI, around the sea defence and around the SSSI crossing, the current ground conditions are very poor and will require improvement to allow construction to proceed. The preferred method of ground improvement is still to be confirmed, however, one method that could be adopted is deep soil mixing. This method enhances the characteristic of the in-situ soil by using a soil mixing rig to mechanically mix the soil with water and a cementitious binder such as cement, fly ash, lime or bentonite.

The areas that need to be improved will require multiple rigs to work concurrently to allow construction works to progress, and current planning allows for 6No rigs to be utilised, each with an expected utilisation of 50m^3 of potable water per day. Note, an environmental sheet pile barrier is to be installed around the North-west corner of the platform to protect the SSSI prior to the ground improvement works commencing.

2.2.1.4. Concrete Batching – Early Works

Concrete batching is summarised in Section 2.2.2.1.

2.2.2. Construction Demands – Main Civils

2.2.2.1. Concrete Batching

A large volume of concrete will be required for many aspects of the construction for Sizewell C, as well as the concrete to construct the power station buildings. There will be an early works concrete demand including the cut off wall, piling, tunnel shafts, guidewall, as well as general early demand for establishment of hardstandings, drainage, roads, foundations, etc. It is expected that early requirements are completed by a temporary batching plant. An allowance for concrete production of tunnel lining segments has also been included.

For each cubic metre of concrete produced, there will be an associated water demand that is made up of two components: the water required within the mix, and the water needed to wash the plant and equipment down at the batching plant. The typical mix water requires approximately 175 litres per cubic metre of concrete, and the wash water is typically 50 litres per cubic metre. For the main concrete batching works, learnings from Hinkley Point C (HPC) power station have demonstrated up to 100% recycling of the concrete wash water for use within the concrete mix, resulting in a 175l/m^3 overall demand. Due to the high standard of concrete batching needed for nuclear grade concrete it is deemed not feasible to utilise water from any other source than potable or the controlled concrete wash water.

For the early concrete batching, due to the smaller and more transient nature of the expected set-up, it would be likely that less concrete wash water would be able to be recycled into the concrete mix. For an initial best estimate, it is assumed that 50% of the wash water is recycled, resulting in a water demand of 200 litres per cubic metre of concrete batched.

2.2.2.2. Tunnelling

For the main tunnelling activities, there iwill be a high water demand associated with each tunnel boring machine (TBM) drive. This includes:

- Production of slurry.
- Production of grout for tunnel annulus filling.
- Cooling water for TBM.

Within the construction programme, there are 3 tunnels to be constructed: 2 intake tunnels and 1 outfall tunnel. It is assumed that there will be an overlap in the drives of these TBMs so that the outfall construction could overlap with the end of the Intake 1 tunnel construction and the start of the Intake 2 tunnel. Initial calculations suggest that this could produce a peak demand of up to 1,250m^3/day for the Intake tunnels and 1,870m^3/day for the Outfall tunnel, resulting in 3,120m^3 of water per day. However, an allowance for around 70% slurry recycling has been made through use of a slurry treatment and recycling plant. Therefore, the forecast demand has been reduced to 2,000m^3 per day at peak.

As explained above.based on contractor advice, it is expected that only potable water could feasibly be used for this activity to ensure control of the properties of the slurry. Any use of water from other sources with variable properties could potentially pose a safety risk to the stability of the excavation.

2.2.2.3. Backfill (with Crag Re-use)

The natural ground in and around the main power station platform needs to be replaced with a suitably compacted fill that is designed to provide a foundation with an adequate strength and support to carry the overlying load down to the stronger underlying ground without excessive settlement and deformation to the structures above. Some of this fill will need to be designed to be "seismically qualified" material, meeting stringent performance and testing requirements.

To reduce the amount of imported fill material, SZC Co. plans to utilise part of the existing Crag Sand that will be excavated from the platform to create a hydraulically bound material as a designed fill which can be batched, laid and compacted. To produce this, the Crag will be blended with granular material, cement or lime and water to create a Cement Bound Granular Material (CBGM). Site trials have suggested that approximately 80 litres of additional water will need to be added to the mix to create 1 cubic metre of the CBGM. Water demand for the backfill is therefore based on the rate of placement of backfill currently planned for the project which spans over several years and varies as required.

2.2.2.4. Associated Developments

Water demands for associated developments includes water required for dust suppression, as well as welfare demand for workers on these different sites. The dust suppression is identified to be possibly supplied through non-potable water sources; however the welfare water demand must be potable quality water.

2.2.2.5. Dust Suppression

Dust suppression will be required particularly for the haul roads around the site, and is assumed to be required in the five months between May and September inclusive. A requirement for dust suppression water for 18 days per month (i.e. 90 days per year based on outputs of typical productive earthworks days) has been assumed at a rate of 3 litres/m^2/day. This value has been optimised by 50% by proposing regular maintenance, low vehicle speeds, and the use of biodegradable dust suppression products.

2.2.2.6. Imported Material

Material that is imported from offsite will also require some damping, depending on the import method. Typically, 20 litres/m^3 has been allowed for imported materials in the five months between May and September inclusive as it is likely the aggregates would be dry during this season and potentially causing dust during handling. The peak daily import volume is approximately 10,000m^3. This equates to approximately 200m^3/day of water required for this construction activity.

2.2.2.7. Road Sweepers

Road sweepers will be required on site to service access roads to ensure these roads are clean. At this stage of design and based on the size of the site, three road sweepers are assumed to be required, with four refills per day, and a water tank is required with a volume of 1.5m^3. These construction activities therefore will require an estimated water volume of 18m^3/day, for an assumed 18 days each month, year-round.

2.2.2.8. Wheel Washes

Wheel washes will be required at site entrance and exits to ensure vehicles are clean prior to leaving site, and maintained on site. Wheel washes are assumed to use 30 litres/vehicle/day. A total of 300 vehicles is allowed for (based on initial estimates of vehicle movements during the excavation phase), resulting in a water requirement of approximately 9m^3/day.

2.2.2.9. Plant washdown

Wash down of plant on site is expected to be required year-round. Each vehicle is assumed to require 3m^3 of water for washdown, once a week. The wash water is expected to be recycled at approximately 75% efficiency, resulting in a water requirement of approximately 0.75m^3/vehicle. During the early years (2022 – 2025), there are expected to be approximately 150 vehicles on site, and thereafter 300 vehicles on site. The water demand for these construction activities therefore varies between approximately 16m^3/day and 32 m^3/day.

2.2.2.10. Irrigation

Water is required for irrigation of newly planted trees across the site. Irrigation values are assumed to allow for 500 trees with a water demand of 25 litres per tree per week. This equates to approximately 1.8m^3/day.

2.2.2.11. Construction demand summary

Table 2-1 show a summary of construction activity water demands and possibilities for construction water recycling or non-potable water to be used for each.

Table 2-1 - Construction Demands

Construction Activity	Water Demand Peak (m^3/day)	Potential Water Quality Requirement
R1/R1++ Backfill	806	100% Potable
R2/R3 Backfill	140	100% Potable
Cut off Wall Slurry	1365	100% Potable Water with 60% recycling allowed for [1]
Cut off Wall Concrete	460	100% Potable Water with 10% recycling allowed for [1]
CFA/Guide wall Concrete	135	100% Potable Water with 10% recycling allowed for [1]
Early Concrete	50	100% Potable Water with 10% recycling allowed for [1]
Deep Soil Mixing	360	100% Potable Water
Tunnelling	2000	100% Potable Water with 70% slurry recycling allowed for [1]
TBM Segments	39	100% Potable Water with 10% recycling allowed for [1]
CDO Tunnel	45	100% Potable Water with 30% recycling allowed for [1]
Main Works Concrete	310	100% Potable Water with 20% recycling allowed for [1]
Dust Suppression	315	Can be 100% Non-Potable
Water requirement for imported materials	88	Can be 100% Non-Potable
Plant Washes	32	Can be 100% Non-Potable
Wheel Washes	9	Can be 100% Non-Potable
Irrigation	2	Can be 100% Non-Potable

[1] Percentage recycling allowed for as discussed in Sections 2.2.2.1, 2.2.1.1, 2.2.1.2 and 2.2.2.2.
[2] Potable water required for this activity as discussed in Section 2.2.1.3.
[3] Potable water required for this activity as discussed in Section 2.2.2.3.

2.2.3. Domestic and Welfare Demands

2.2.3.1. Workforce Profile

A forecast workforce profile for the duration of construction has been created and submitted as part of the Development Consent Order (DCO) application. This has been used to generate potable water welfare demands across the construction programme. This includes all water required by people on site, including drinking water, food preparation, showering, toilets, etc.

2.2.3.2. Domestic/Welfare Demand

Using the forecast workforce profile and lessons learnt from HPC, a domestic/welfare demand has been estimated. According to HPC, a usage of 75 l/person/day is estimated on site. This is a 25% reduction in the demand that the document “British Code of Practice: Flows and Loads – Sizing Criteria” recommends. The reduction accounts for the fact that not all workers on site will use the canteen facilities. HPC also aimed to provide water saving systems such as waterless urinals, pressure reducing taps, and shower flow limiters.

For domestic/welfare demand on SZC, 75 l/person/day has been allowed for across the construction programme. As the population on site increases over time, the welfare potable water demand will increase proportionally.

2.2.3.3. Building Demand

When temporary buildings are constructed on site, a temporary commissioning load for each building has been allowed for in the demand profile. The commissioning load depends on the capacity and usage of the building. For example, the Main Forward MCA Site Office (HAE), with a capacity of 3,400 people, and usage as a site office with canteens, will have a higher commissioning demand than the Main Project Office (HAW) with a capacity of 840 people. When the buildings are proposed to be constructed, according to the construction programme, a one-off demand is included in the forecast demand profile, which allows one full day of usage for the total capacity of the building. It is assumed that commissioning of the building takes place over the course of a week, therefore the total demand is divided across one week, and applied conservatively to the month the building comes online.

2.2.3.4. Accommodation

Accommodation will be provided at SZC for up to approximately 3,000 people at peak. This includes a campus accommodation facility for 2,400 people, as well as accommodation in caravan pitches within the Ancillary Construction Area (ACA). Campus accommodation includes canteens, bars, laundries as well as standard bathroom facilities for all residents.

Data for the campus at HPC has been collected, and an average demand per person per day has been recorded at 85 l/person/day. The actual design numbers for the HPC campus facility were 120 l/person/day. The reduced value of 85 l/person/day has been used for the SZC campus demand.

This demand has also been conservatively applied to the accommodation at the caravan pitches.

2.2.4. Construction Phase Summary Output

Using the best information available outlined in the sections above, Figure 2-1 provides a summary of the construction phase demand with all construction activities and domestic/welfare demands overlaid to provide an overall demand profile which indicates where peak demands occur across the construction period.

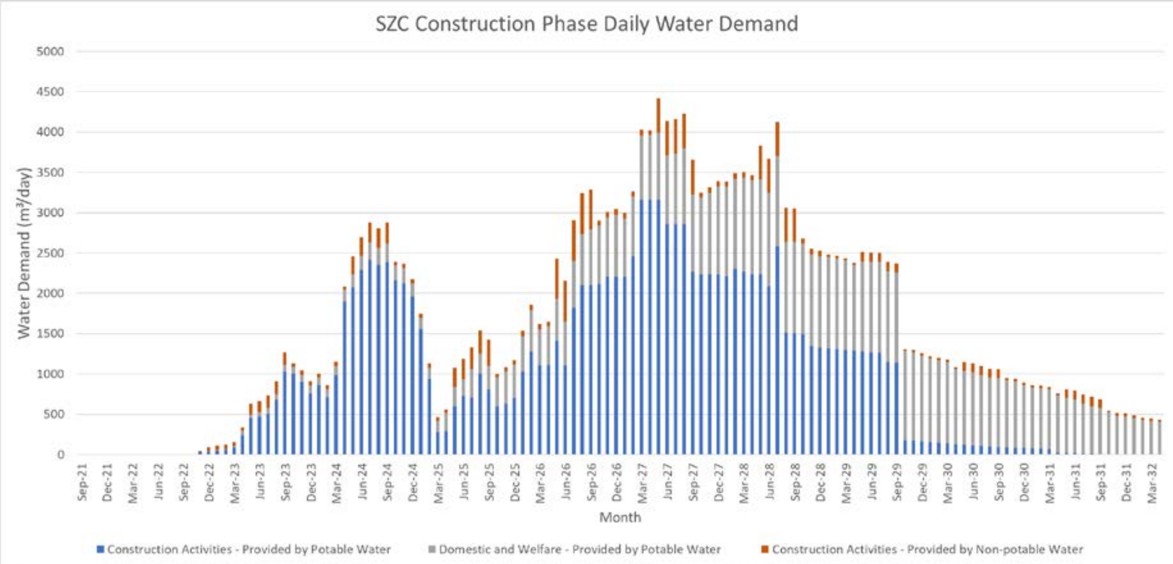


Figure 2-1 - Construction Phase - Water Demand Profile Maximum Daily Demands per Month

2.3. Commissioning Demand

The forecast demand profile for commissioning is created using the following estimations/ assumptions:

- During HPT+ FPT phase, The SEG and SEP tanks in the HOR building will be filled up in a month.
- The welfare and domestic (SEP) need is calculated using the workforce profile and an estimate of 90l/day per person from Month 52 to 72.
- There's a 50% allowance included in the industrial water (SEI) demand calculation.
- There will be less water demand for U2 commissioning as all the major combined systems will be tested and commissioned during U1 commissioning.
- The Hot functional testing phase will last for 12 months.
- Maximum daily demand for the HOR building is reached during the last 12 months of U2 commissioning.
- J0+ 72 months is the COD for Unit 1.

2.4. Operational Demand

During operation, there is an 18-month fuel cycle consisting of a 16-month normal operation and 2-month outage.

The table below shows the daily potable water demand from the HOR building during normal operations and outages.

Table 2-2 - Average water demand at each system

System	Average water demand per system (m^3/day) (both units in normal operation)	Maximum demand (m^3/day) (1 unit in Normal operation + 1 unit in outage or commissioning)
Storage and supply of potable water (SEP)	230	230
Storage and supply of industrial water (SEI)	1,790	2,640

Total daily demand	2,020	2,870

SZC Co. will continue to research and develop opportunities of using non-potable or recycled potable water to reduce the overall potable water demand during commissioning and operations. Figure 2-2 and Figure 2-3 show the commissioning and operational demand for the power plant. Figure 2-3 splits this further by showing the potable water required for welfare and potable water required for industrial purposes.

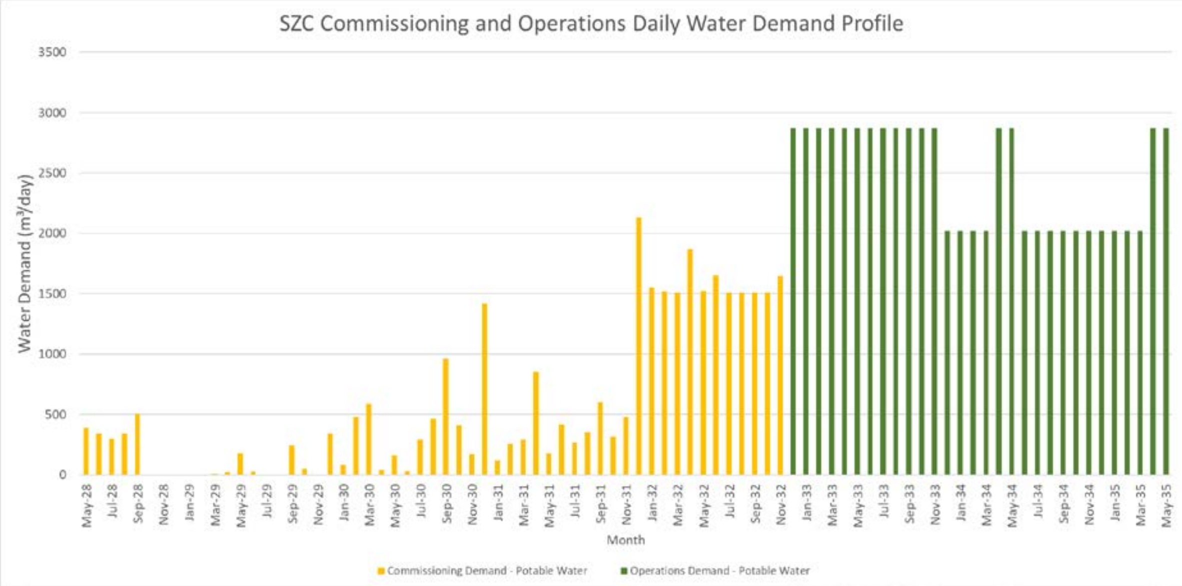


Figure 2-2 - Commissioning and Operation Demand Profile

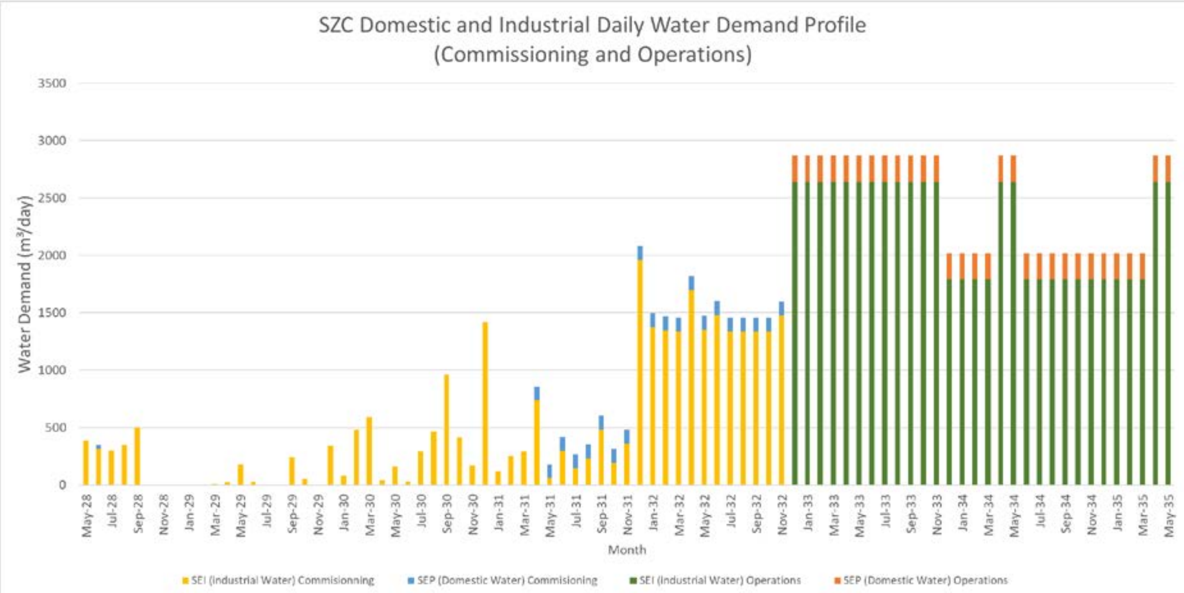


Figure 2-3 - Commissioning and Operations Phase - Industrial and Domestic Demand Profile

2.5. Integrated Water Demand

An integrated water demand profile is provided in Figure 2-4. This includes construction, commissioning and operation potable and non-potable water demands.

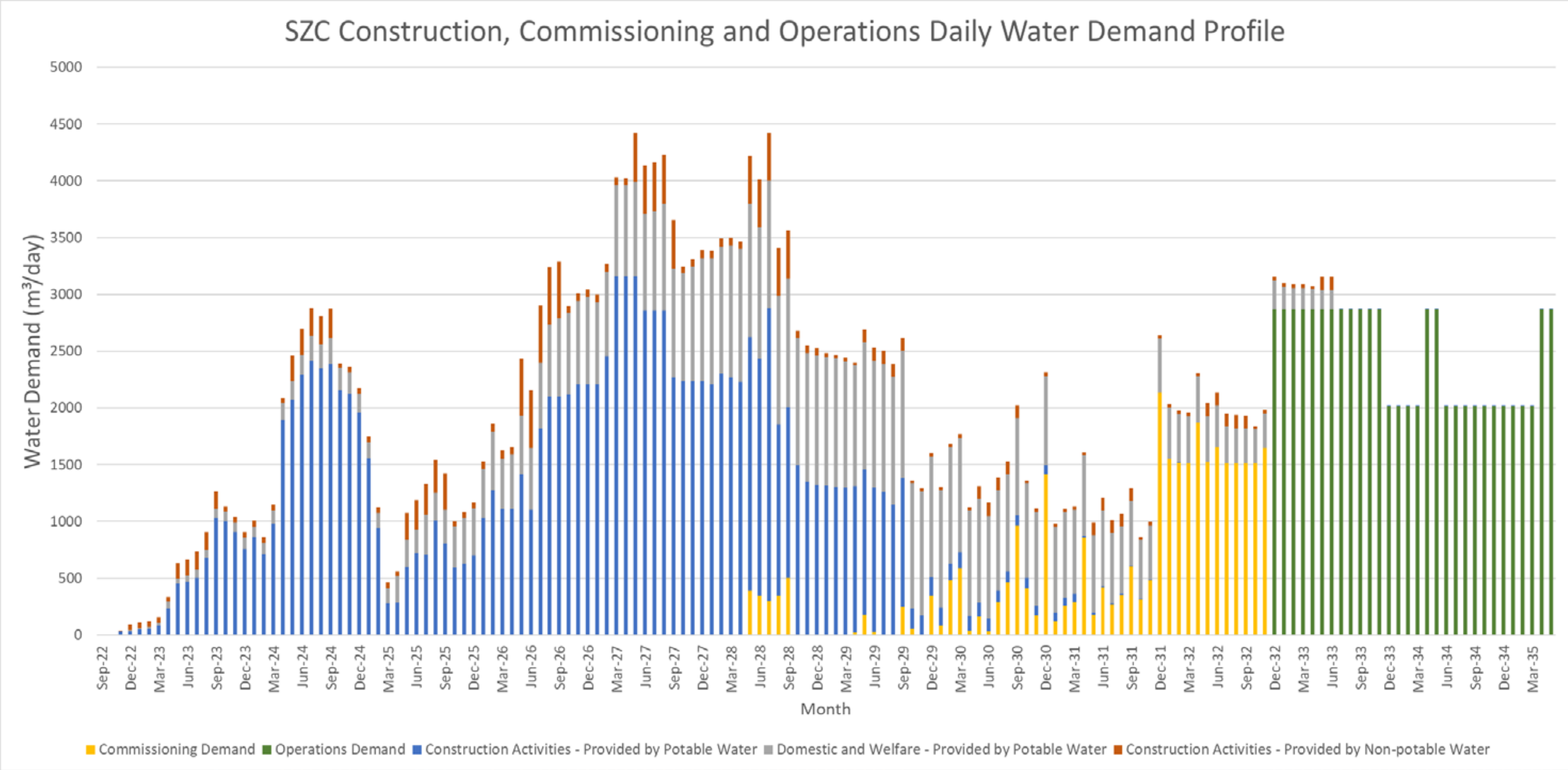


Figure 2-4 – Whole of Life - Water Demand Profile Maximum Daily Demands per Month

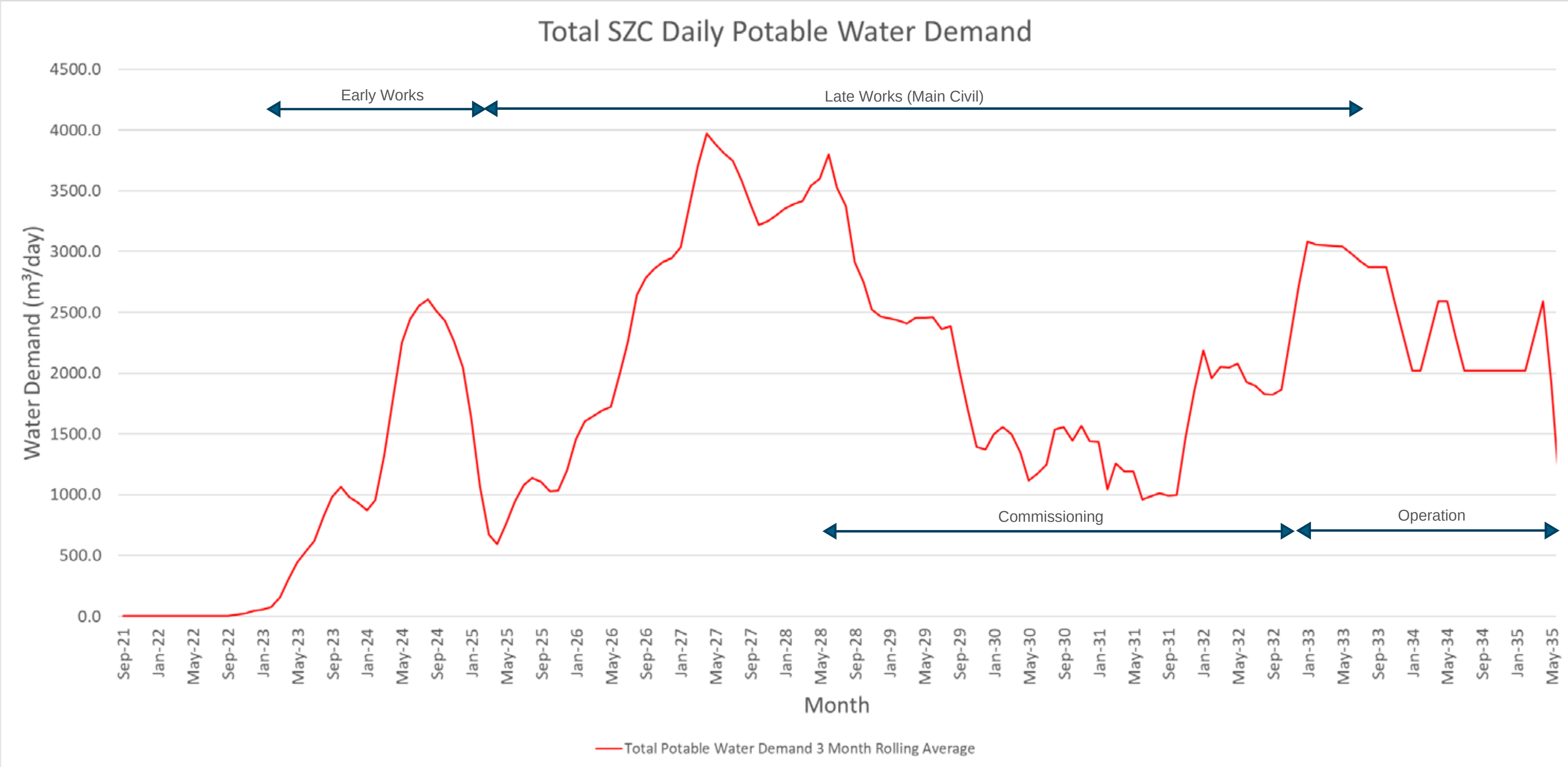


Figure 2-5 - SZC - Total Potable Water Demand - Construction, Commissioning, Operation – 3 month rolling average

3. Water Supply Strategy

3.1. Overview

SZC requires a substantial volume of water throughout construction, commissioning and operation of the power plant. SZC Co. aims to use water in a sustainable manner, focusing first and foremost on reducing the amount of potable water that is required on the site. This will be achieved through several methods:

- Construction water recycling. Construction water, particularly tunnelling and concrete batching, will be recycled in the construction process as much as possible.
- Identifying activities that can use non-potable water. For example, where dust suppression is required, potable quality water should not be used. Other examples include wheel washing, irrigation, road sweepers, and general plant cleaning.
- Other water reduction techniques. In office buildings where there are welfare facilities, water reduction techniques shall be used, such as waterless urinals, sensored taps, low-flow showers, etc.

Where non-potable water is required on site, a number of credible sources have been identified, and are included and discussed in Section 3.3.2.

Despite aiming to reduce potable water demand, there is still a substantial potable water demand for which SZC Co. requires a dedicated supply to allow construction, commissioning, and operation of the power plant.

3.2. Potable Water Supply Options and Strategy

The local water resource zone (Blythe WRZ) is known to be lacking in spare capacity and therefore is not able to supply SZC with the outlined potable water demands. Discussions with Northumbrian Water Limited (NWL) have identified the opportunity to provide a connection from a separate water resource zone (Northern/Central WRZ) which may contain spare capacity to supply the peak demand of 4,000m^3/day to SZC subject to completion of NWL's part of the Environment Agency led Water Industry National Environment Programme (WINEP) study.

To allow the transfer of this potential spare capacity, a new potable water transfer main is required from Barsham to Sizewell C, as well as some network upgrades. NWL have indicated that subject to the ongoing abstraction sustainability work, they won't be able to supply the Sizewell C Project until December 2024 at the earliest, and there is significant programme risk around this milestone. A connection of 2,000m^3/day from July 2026 and 4,000m^3/day from December 2026 is therefore assumed for the purpose of this water supply strategy, which NWL consider to be realistic. NWL have identified June 2028 as the latest credible date that the transfer main would be fully available. The strategy therefore allows for the provision and retention of a temporary desalination plant until this date, to mitigate the programme risk around delivery of the NWL transfer main by December 2026.

Because of the phasing challenges discussed above, the provision of water to the site is proposed across three separate phases:

- Phase 1 – October 2022 – January 2024 – Water provided through trucks.
- Phase 2 – October 2023 – December 2026 – Water provided through local temporary desalination plant on site. The end date aligns with the availability of NWL's transfer main, however this phase can be extended as required until such time the NWL transfer main is fully available.
- Phase 3 – July 2026 (initial 2,000m^3/day supply) and December 2026 (4,000m^3/day supply) onwards – NWL transfer main.

Each of the supply phases identified above allow continuous provision of potable water throughout the design life of SZC, from early construction to operation. There is overlap between Phase 1 and Phase 2 to allow for programme risk to the desalination plant, and an ability for Phase 2 to extend further until the NWL transfer main is fully available.

The three phases are discussed in the following sections.

3.2.1. Phase 1 – Water Trucks

The Early Works construction phase is proposed to begin in December 2022. There is a brief period before this date where a small volume of water will be required for early site establishment and site surveys and trials, and therefore water supply by truck has been allow for from October 2022. This water would not be sourced within the local Blyth area which is resource-constrained. If NWL confirms that it can supply Sizewell C from Barsham WTWs, near Beccles, it may be sourced from there, although no decisions have been made and one or more other sources may be used. The desalination plant will be constructed and commissioned, ready to supply the site with water by the start of October 2023. To allow some contingency in supply methodology, Phase 1 is extended to January 2024, providing a 4 month overlap between Phases 1 and 2. This is indicated in Figure 3-1.

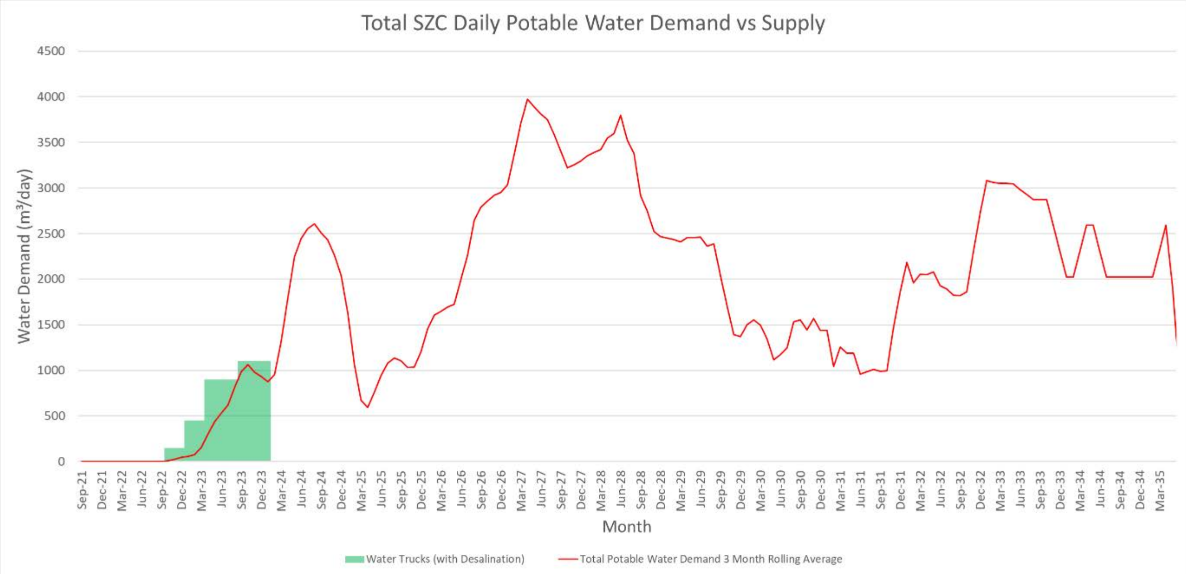


Figure 3-1 - SZC Daily Potable Water Demand vs Phase 1 Supply via Water Trucks

Water trucks have a volume of up to approximately 30m^3. The truck numbers and water volumes supplied in the three-step process indicated in Figure 3-1 are summarised in Table 3-1.

Table 3-1 - Phase 1 - Water Truck Supply Figures

Start Date	End Date	Number of Trucks per day	Water Volume Supplied (m^3/day)
Oct-22	Jan-23	5	150
Jan-23	Apr-23	15	450
Apr-23	Aug-23	30	900
Sep-23	Jan-24	37	1,110

The number of trucks and stepped approach can be refined but at this stage the estimate is considered suitable for an indicative conservative Heavy Goods Vehicle (HGV) allowance.

While this will increase the HGV movements into the site, the increase in truck numbers sits within the allowable 300 HGV DCO daily limit proposed. The current proposed peak HGVs for the first year, averaged over the quarter, are summarised in Table 3-2 (before account is taken of the water trucks).

Table 3-2 – Average Heavy Goods Vehicle Movements

	Year 1 (2023)				Year 2 (2024)
Quarter	Q1	Q2	Q3	Q4	Q1

Peak HGVs/day	181	254	251	252	185
DCO Limit/day	300	300	300	300	300
Additional Availability/day	**119**	**46**	**49**	**48**	**115**

3.2.2. Phase 2 – Local Desalination

Because the NWL external transfer main will not be available to supply the site realistically until December 2026, an intermediate solution is required between early water truck provision to site (proposed to end January 2024), and the NWL transfer main. To fill this supply gap, a temporary, local desalination plant will be located on the Main Development Site (MDS) to provide up to approximately 2,650m^3/day. As discussed in the previous section, a desalination plant can be brought into site and commissioned by October 2023, allowing a four-month overlap between Phase 1 and Phase 2. This is indicated in Figure 3-2. The design life of the desalination plant could extend further, until such time that the NWL main is available, providing up to 4,000m^3/day if necessary. At the time the NWL main is available, the plant would be decommissioned and removed from site. It is assumed, as a backstop, that this will happen before commencement of the operational phase of Sizewell C.

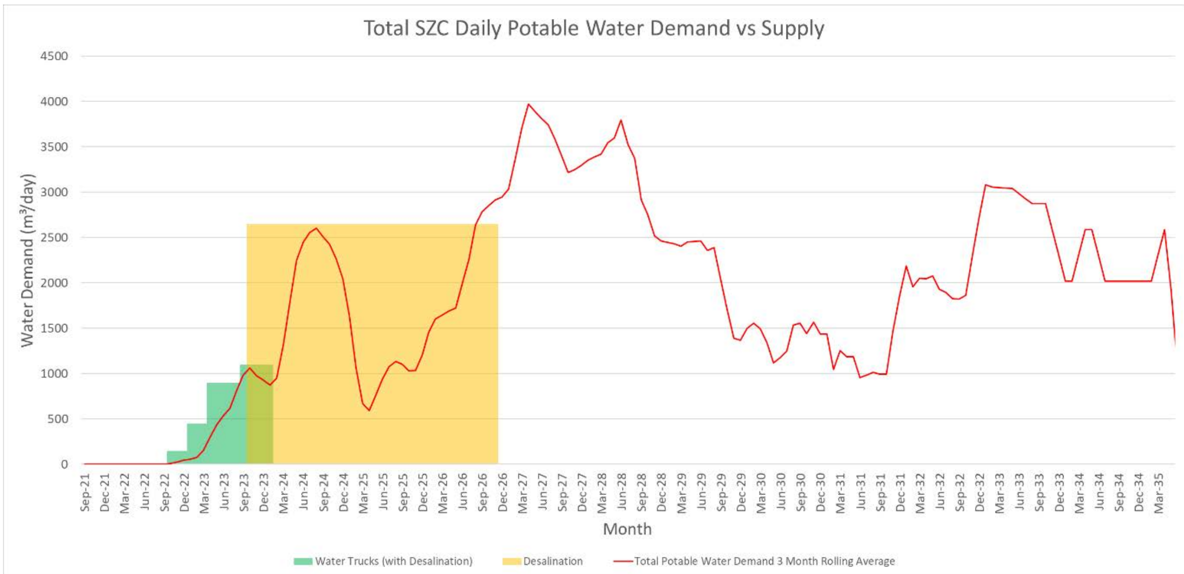


Figure 3-2 - SZC Daily Potable Water Demand vs Phase 1 and Phase 2 Supply

The plant will provide approximately 2,650m^3/day potable quality water, and generate approximately 4,000m^3/day reject water to discharge back into the sea via the outfall. It is assumed the plant will be required until December 2026 to mitigate potential delay in delivery of the NWL transfer main as shown in Figure 3-2.

The desalination plant is proposed to be a sea water reverse osmosis (SWRO) plant which includes:

- Intake pipe (500m length, 250mm diameter) with screen, and outfall (325m length, 200mm diameter) with diffuser.
- Intake pumping station approximately 17m x 15m footprint with duty standby submersible pumps.
- Main SWRO plant approximately 70m x 55m footprint, including
  - Treatment containers
  - RO feed tanks
  - Water storage tanks
  - Mechanical / electrical control building
  - Storage / parking / loading areas

- Sludge storage tank
- Discharge balancing tank.

The layout of the plant is shown indicatively in Figure 3-3.

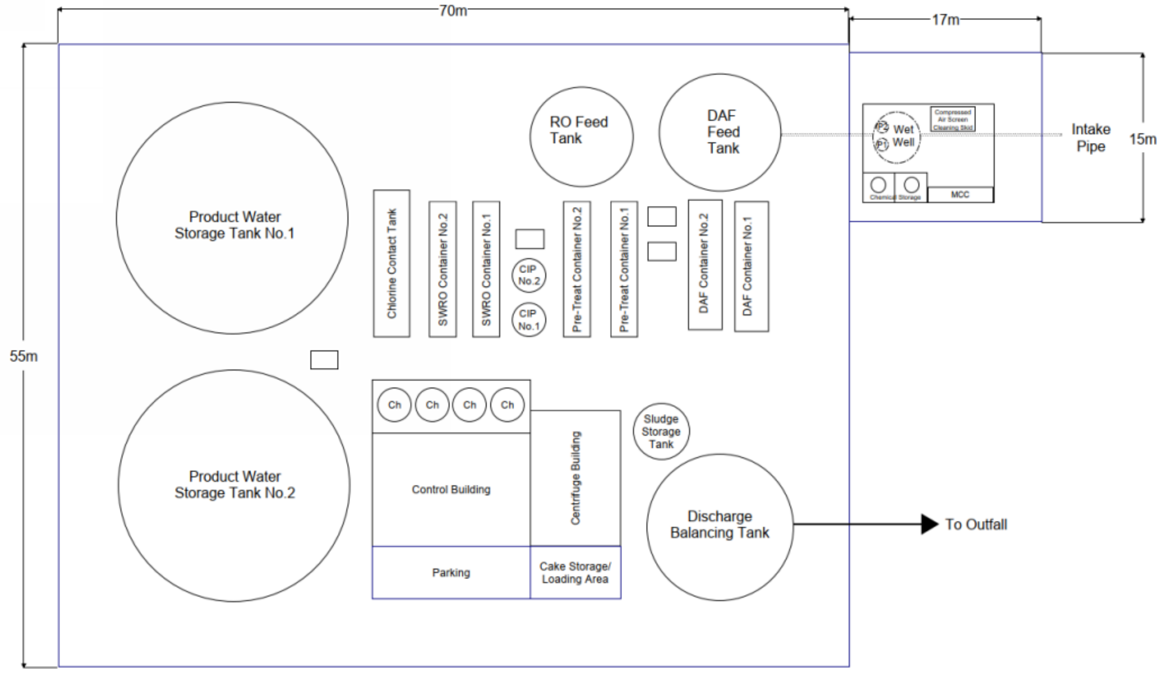


Figure 3-3 - Indicative SWRO Plant Layout

3.2.3. Phase 3 – NWL transfer main

The existing potable water network near the site is owned by Northumbrian Water Ltd (NWL). This draws upon the local Blyth Water Resource Zone (WRZ). NWL has confirmed that they are unable to supply any water to Sizewell C from this zone. There is some potential spare capacity in the WRZ at NWL's Barsham Water Treatment Works near Beccles which is located in their Northern / Central WRZ, from which water is proposed to be transferred to Sizewell via a 28km pipeline. This transfer will also require other water network enhancements, which NWL are currently investigating. The proposed transfer main would connect into the local Blyth distribution network at Saxmundham Water Tower, and at other locations subject to detailed design. These local connections have the potential to provide significant legacy benefit by increasing capacity and resilience of the distribution network.

The Environmental Agency (EA) led Asset Management Plan (AMP)7 Water Industry National Environment Programme (WINEP) for NWL's Northern/Central WRZ is due to finish shortly. This will determine the potable water resource that can sustainably be abstracted at Barsham for Sizewell C.

Alongside the WINEP, NWL have been investigating the likely programme for delivery of the transfer main, and have advised recently that it cannot be delivered before December 2024 **at the earliest**. They have advised that it is likely to be feasible to complete the transfer main by December 2026. June 2028 has been identified by NWL as a 'worst case' backstop completion date for the pipeline.

For the purposes of the water supply strategy for SZC, a supply of 2,000m^3/day by July 2026, stepping up to 4,000m^3/day in December 2026 has been assumed, which has been discussed with NWL.

The supply phasing including this is shown in Figure 3-4. The potential for a December 2024 supply from NWL has been shown on the graph in Figure 3-4 by the blue dashed line and light blue hatch. Phase 2, supplied through desalination, overlaps this blue dashed line to emphasise that the NWL transfer main cannot be relied upon in this period, and thus extends to December 2026. More work is required to define the exact NWL availability date, however for the purpose of the water supply strategy currently a December 2026 NWL transfer main completion date has been assumed. The temporary desalination plant would be retained until the transfer main is available. It is assumed that the transfer main will be available from commencement of operation of Sizewell C **at the latest**.

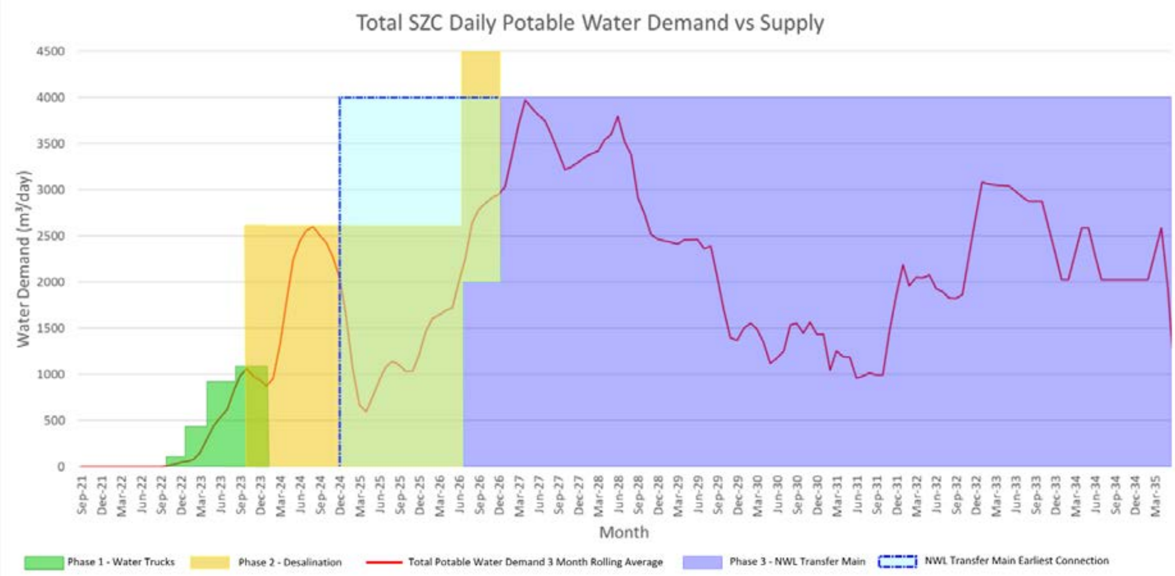


Figure 3-4 - SZC Daily Potable Water Demand vs Phase 1, 2 and 3 Supply

3.3. Potable Water Reduction Measures

The use of potable quality water will be reduced as much as possible on site to ensure that the project is as sustainable as possible with respect to water usage. The following sections describe the measures that will be undertaken to reduce the potable water demand at SZC, and in summary include:

- Water recycling in construction processes.
- Non-potable water usage where possible (treated foul water, rainwater harvesting).
- Non-potable water storage.
- Water reduction fixtures and fittings.
- Potable water storage.

3.3.1. Water Recycling During Construction

As far as possible, construction activities will recycle water through the construction process, to reduce the potable water input. Values and explanations are provided in Table 3-3:

Table 3-3 - Water Recycling - Construction Activities

Construction Activity	Percentage reduction of potable water due to recycling	Description
Tunnelling (CDO and main tunnels)	70%	Based on a methodology of recycling the returned slurry and processing this for re-use, a 70% saving on potable water is feasible
Cut-off wall	70%	Similar to tunnelling, a slurry-based construction methodology will be required for the cut-off wall, and using the same principles of slurry processing and recycling, a 70% saving on potable water is feasible
Concrete batching (early)	10%	The concrete batching process includes washing out plant and vehicles involved in batching. The water used to wash the plant and vehicles is reused in the concrete batching process at a 25 litre : 200 litre ratio

		of wash-water: potable water in the early years.
Concrete batching (late)	20%	The concrete batching process includes washing out plant and vehicles involved in batching. The water used to wash the plant and vehicles is reused in the concrete batching process at a 50 litre : 175 litre ratio of wash-water: potable water.

3.3.2. Non-potable Water Usage

This report identifies a number of construction related activities that have an opportunity to use non-potable water in place of potable which is important to reduce the overall potable water usage on site. These activities include:

- Dust suppression.
- Vehicle washing.
- Wheel washing.
- Imported material placement.
- Irrigation.

The volume requirements of these activities have been identified in Section 2.2.2, and a profile specifically for non-potable water demands during construction is provided in Figure 3-5. The peak non-potable water demand on site is approximately 500m^3/day.

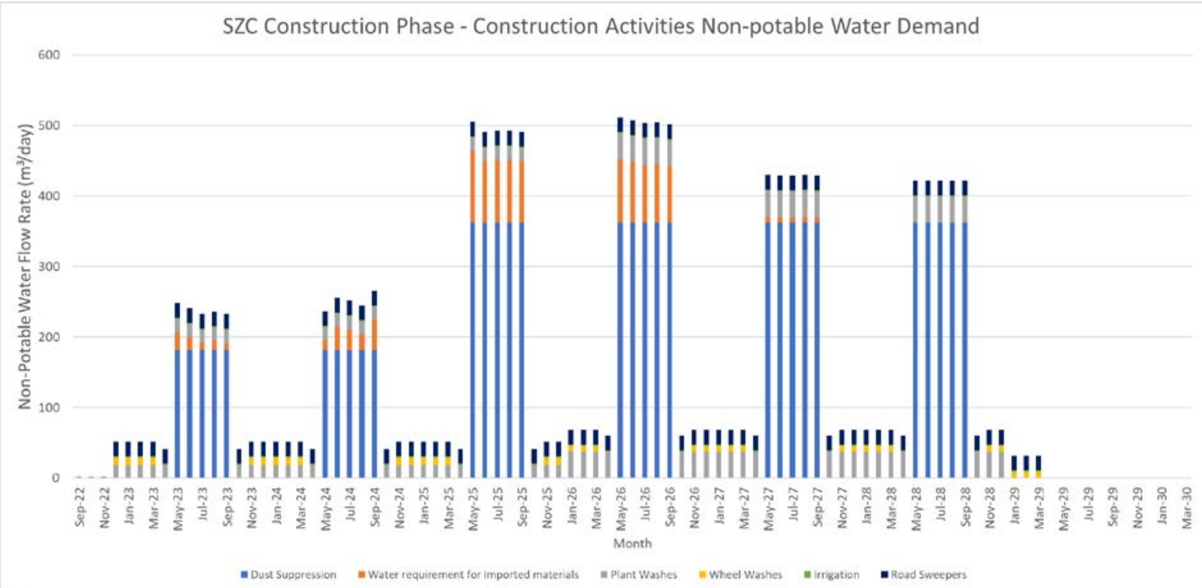


Figure 3-5 - Water demands sourced from non-potable supply for the construction period

To provide these activities with water, potential non-potable sources have been identified. A long-list of options was originally included in the May 2020 DCO application (in Appendix K to the Planning Statement [APP-590] as well as the update in the January 2021 change submission (Appendix 2.2.D of Volume 3, Chapter 2 of the First Environmental Statement Addendum [AS-202]). A short-list of credible non-potable water supply options, with potential supply volumes and level of confidence of use in construction is summarised in Table 3-4.

Table 3-4 - Non-potable water supply options – summary

Option	Description	Potential Volume Supplied (range, m^3/day)	Confidence Level [1]	Status
SZB Treated Foul Water Reuse	Following early conversations with the operational team at SZB, there is an opportunity to take the output from the treated Sizewell B sewage works and divert it for use as a resource, subject to quality and chlorination treatment.	100 - 180 [2]	High	Further consultation with SZB is required to determine the available capacity on site. SZB have quoted a capacity of 200m^3/day, however this needs to be confirmed through further analysis. A network will need to be constructed to transfer the flows from SZB to SZC.
SZC Treated Foul Water Reuse	This option would take the treated output from the proposed Sizewell C treatment works and divert it for use as a resource – either non-potable or potable, subject to quality and further treatment.	0 - 890 depending on workforce profile [3]	High	The next stage of design will further confirm the availability of foul water, and levels of treatment provided. The treatment will need to involve tertiary level treatment such as UV light and chlorination to disinfect the water.
Existing abstraction points	There are two existing abstraction points that currently are used for irrigation of crops within the order limits. When construction begins, these crops will no longer require irrigation and thus the licences will be unused. The abstractions are for non-potable surface water which could be used for non-potable activities on site.	220 [4]	Medium	Further consultation is required with the licence holders and the Environment Agency to identify how much of the licence can be used on SZC.

[1] Confidence level indicates the likelihood of the option being able to provide SZC with the potential non-potable water volume.
[2] SZB treated foul water information provided in Section 3.3.2.1.
[3] SZC treated foul water profile provided in Section 3.3.2.2.
[4] Existing abstraction points discussed further in Section 3.3.2.4.

3.3.2.1. Sizewell B Treated Foul Water

The foul water treatment plant at SZB currently treats and discharges foul water to sea. The foul water could instead be diverted to the Sizewell C construction site for use in construction activities that do not require potable water. Approximate monthly volumes for the SZB foul water treatment plant from actual readings from 2019 are provided in Table 3-5.

Table 3-5 - SZB Treated Foul Water Volumes - 2019

Month	Volume (m^3)	Volume per day (m^3/day)
April	3,850	128
May	3,970	128
June	5,525	184
July	3,555	115
August	3,265	105
September	3,445	115
October	4,275	138
November	3,365	112

The values in Table 3-5 range between 105m^3 to 184m^3 per day in August and June respectively. The average monthly value is 3906m^3 (approximately 128m^3/day).

This treated water could be chlorinated to provide a further level of treatment, and then transferred to be stored for later use in the Water Resource Storage Area (WRSA) to the north of the site. More information on the WRSA is provided in Section 3.3.3.

3.3.2.2. Sizewell C Treated Foul Water

Foul water produced at SZC is dependent on the workforce profile on site at the time. The workforce profile is described in Section 2.2.3.1. A foul water production rate per person is taken as the same as the potable water demand per person, allowing for 5% losses/wastage. That means foul water from a worker on site is estimated at 70 l/person/day, and foul water from accommodation is estimated at 80 l/person/day.

A foul water curve for SZC and a baseline SZB foul water of 100m^3/day is provided in Figure 3-6.

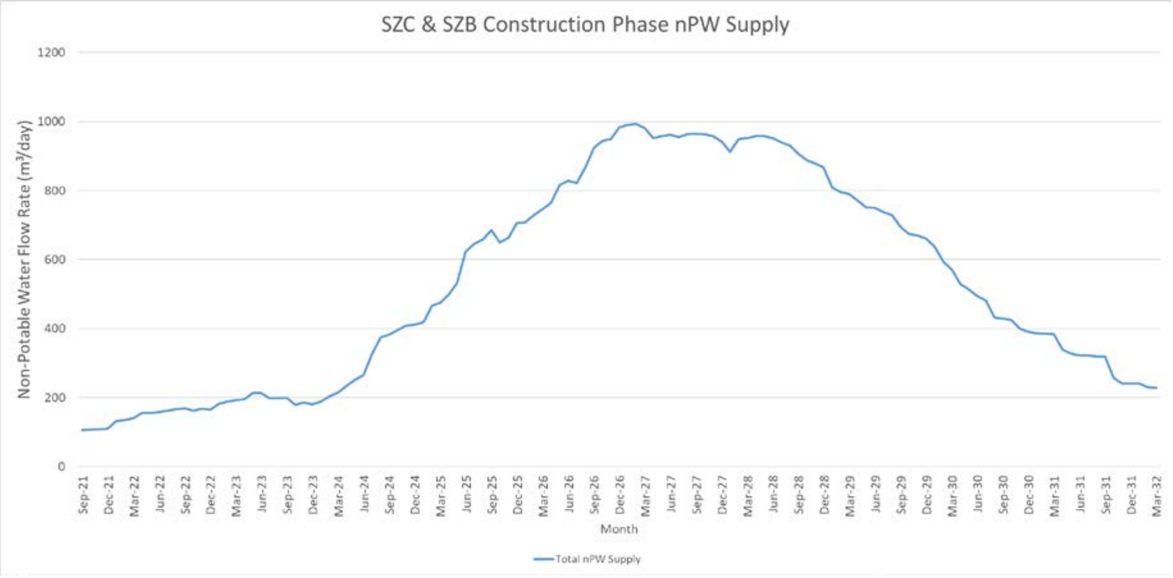


Figure 3-6 - SZC Foul Water Production - Welfare and Accommodation

3.3.2.3. Non-potable Demand vs Supply

Construction activities with an opportunity to use non-potable water sources across the construction period vs the potential supply is shown in Figure 3-7.

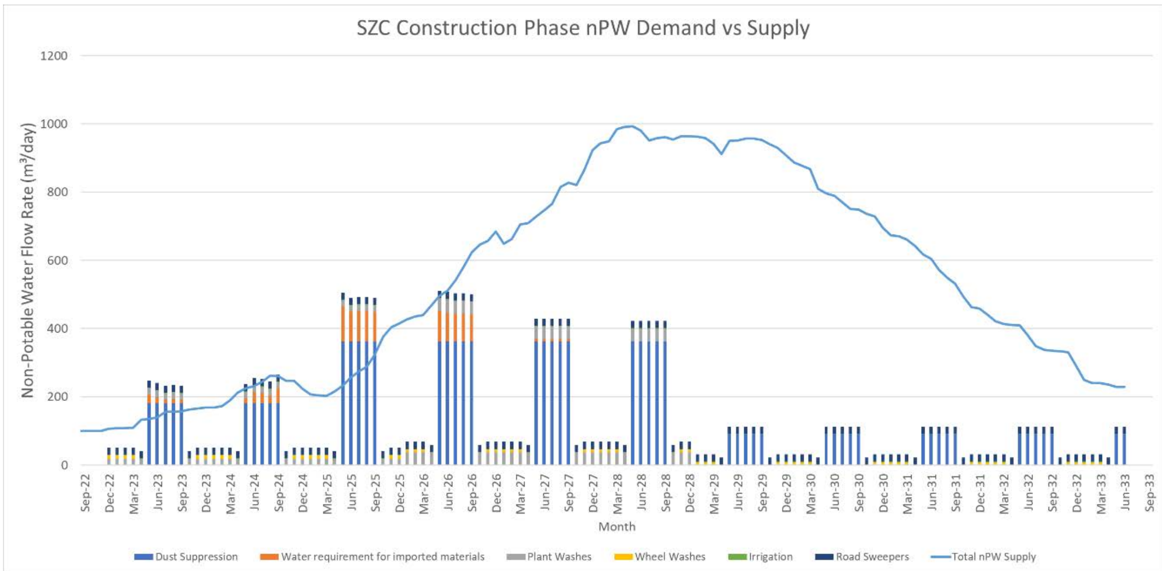


Figure 3-7 - Non-potable water demand vs supply

In the early years the construction activities that could be supplied by a non-potable water source are greater than the available non-potable water supply from SZB and SZC treated foul water as shown in Figure 3-7. This will be offset by the ability to store non-potable water in the winter months with much lower demand – see Section 3.3.3. Non-potable water storage will allow up to 16,000m^3 to be stored in the winter months and then used in the summer months. This will provide additional supply in the first three years where direct supply from treated foul water is not sufficient, through buffering treated foul water in the winter months and using this in the summer months where the demand is greater than the supply.

3.3.2.4. Existing Abstraction Points

There are two existing surface water abstraction points located as shown in Figure 3-8. Both are located within the EDF Sizewell estate. They are both currently licensed for crop irrigation. The land that is being irrigated sits entirely within the main development site and would therefore become redundant. These two abstraction points have a combined yearly abstraction allowance of approximately 80,000m^3/year, equating to approximately 220m^3/day and could be used to provide SZC with a source of non-potable water. The northern abstraction point is in close proximity to the proposed Water Resource Storage Area (WRSA, discussed in Section 3.3.3), and therefore is particularly well suited to be used in addition to treated foul water discussed to meet the SZC demand.

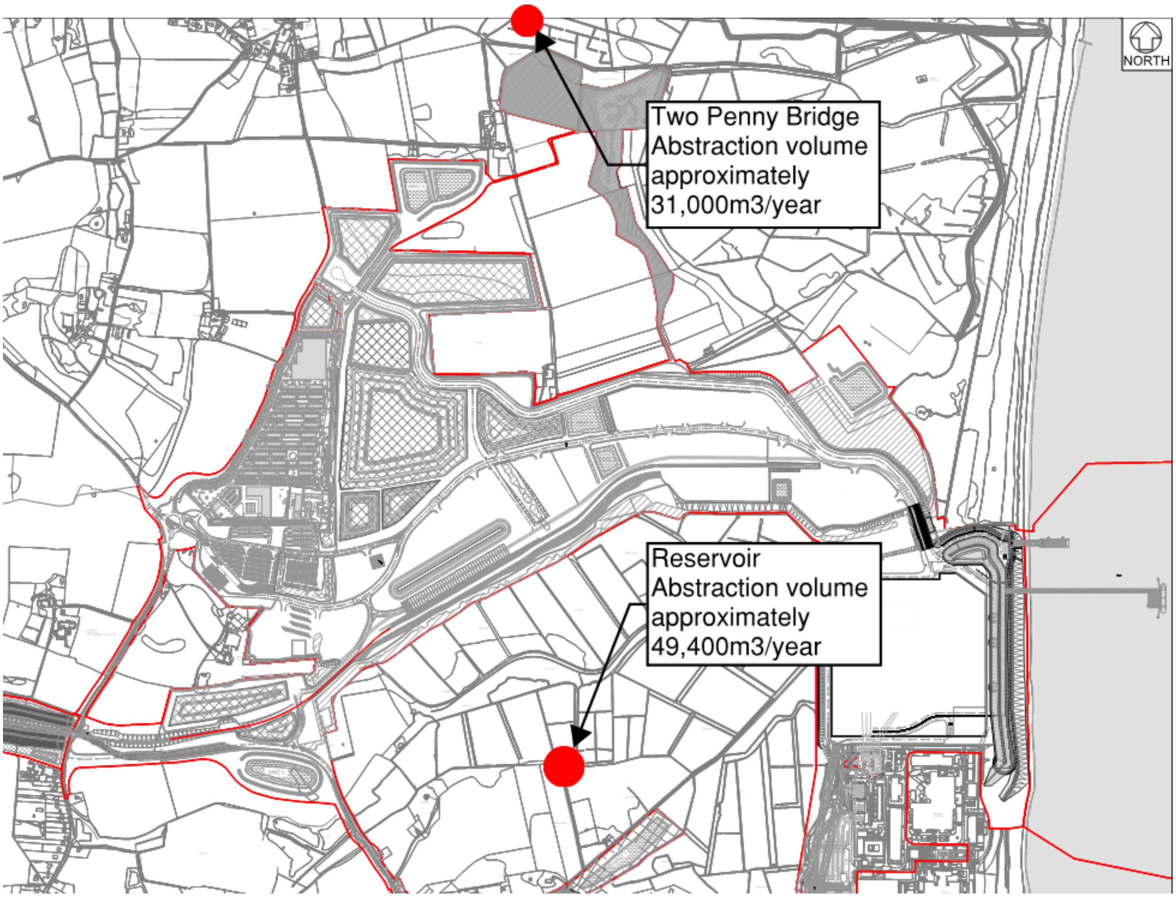


Figure 3-8 - Non-potable Water Existing Abstraction Points

3.3.3. Non-Potable Water Storage

Storage of non-potable water is required to provide a buffer volume, to storage water in winter months and be utilised in more intensive water demand periods. Non-potable water storage is provided on site in two ways:

- A Water Resource Storage Area (WRSA) and
- Storage tanks downstream of each SZC foul water treatment plant.

These are both discussed in the following sections.

3.3.3.1. Water Resource Storage Area (WRSA)

The WRSA is located to the north of the construction site as indicated in Figure 3-9.

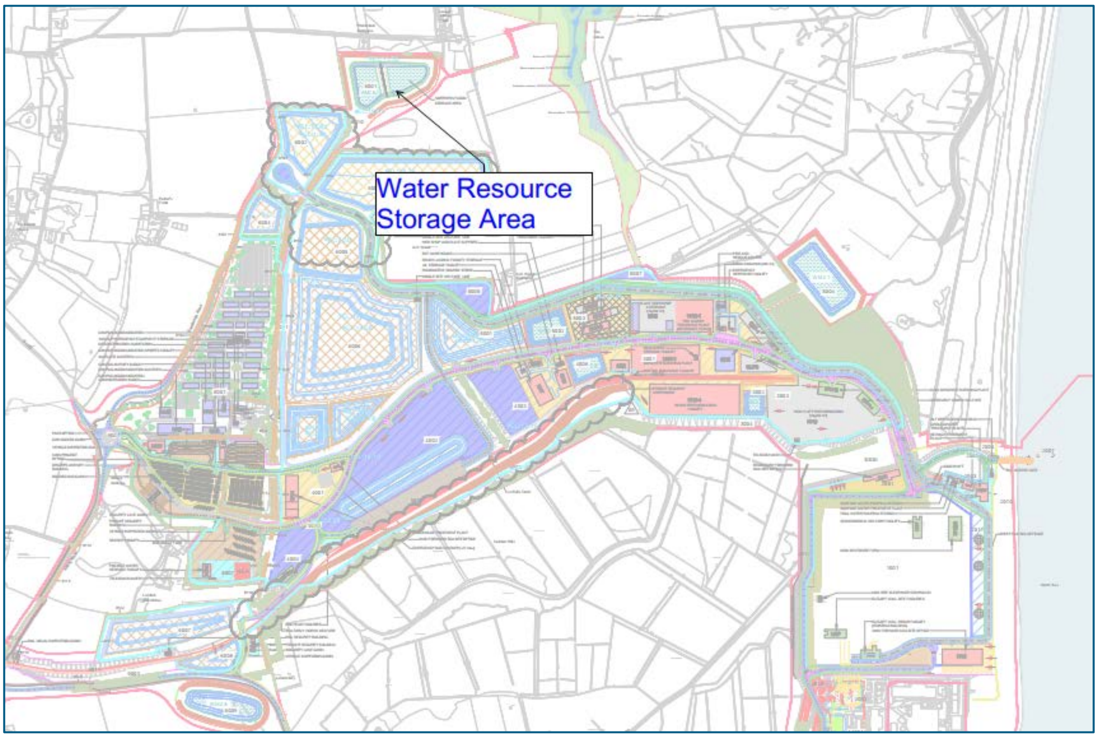


Figure 3-9 - Water Resource Storage Area Location

The WRSA will provide a storage volume of approximately 16,000m^3. Earthworks borrow pits and stockpiles are located immediately to the south of the WRSA. Given the non-potable water will likely be used predominantly for dust suppression, this close proximity will allow easy access to the non-potable water storage.

Because the WRSA is adjacent to a water management zone infiltration basin (WMZ), there is the option to connect the WMZ to the WRSA with a low-level pipe to allow a trickle feed of surface water into the storage area. This low-level pipe would have a non-return valve to prevent stored water returning to the WMZ5 infiltration area. The WRSA will also be supplied with treated foul water from SZC / SZB treatment plants. Treated foul water may be transported to the WRSA via a pressure pipe network or by trucks. This will be confirmed during the next design phase.

3.3.3.2. Treated Foul Water Storage

There is a further storage allowance for treated foul water from each of the foul water treatment plants on SZC. Immediately downstream of each treatment plant, an allowance has been made for a 50m^3 storage tank to hold treated foul water for reuse. The volume of this tank can be increased in size in the next design phase to maximise treated foul water reuse.

3.3.4. Water Reduction Fixtures

To reduce potable water demand on site, the following features will be designed for at SZC within site buildings:

- Grey water diverters – Implement a system collecting used grey water from sinks and washrooms where possible. As an example, grey water could be used to flush toilets.
- Rainwater harvesting – Install rainwater tanks and/or blue roofs across site on buildings that can collect rainwater and then reuse this water internally for things like toilet flushing.
- Push fit or sensored taps in accommodation and offices – limit the flow of all taps on site to reduce the risk of taps being left on.
- Shower timers for accommodation.
- Waterless urinals.

3.3.5. Potable Water Storage

3.3.5.1. Construction Phase

To provide a buffer storage for potable water, a 1,600m^3 storage tank has been allowed for near the TCA potable water connection. This storage tank provides a buffer for firefighting flows, as well as instantaneous peak flows during water intensive construction periods, so the site demand is not directly taking from the external network.

A separate 1,000m^3 potable water storage tank has been allowed for at the concrete batching plant, to provide an emergency allowance for concrete batching, and to reduce instantaneous flow demand on the network.

During construction of the main tunnels, a 2,000m^3 volume of additional potable water storage will be provided on site to allow for water intensive tunnelling periods.

All potable water storage described above aims to reduce the impact of any instantaneous peak demands throughout the construction project.

3.3.5.2. Operation Phase

As described in Section 2.1.1.3, there are 2 SEP tanks with a volume of 300m^3 each and the average daily demand for the SEP is 230m^3/day.

The Diversified Ultimate Cooling Water Supply System (SEG) is required in emergency situations that may potentially result from the occurrence of extreme external hazards exceeding design basis scenarios regardless of the reactor states. The SEG system can also be used to provide firefighting capability in other situations than Fukushima type events. The SEG tanks will also act as buffer capacity. There are 3 SEG tanks with a volume of 9,000m^3 each.

4. Conclusion

This report has summarised the overarching water supply strategy for the construction, commissioning, and operation of Sizewell C (SZC) nuclear power station, as well as provided an updated and integrated water demand profile for the power station over these phases.

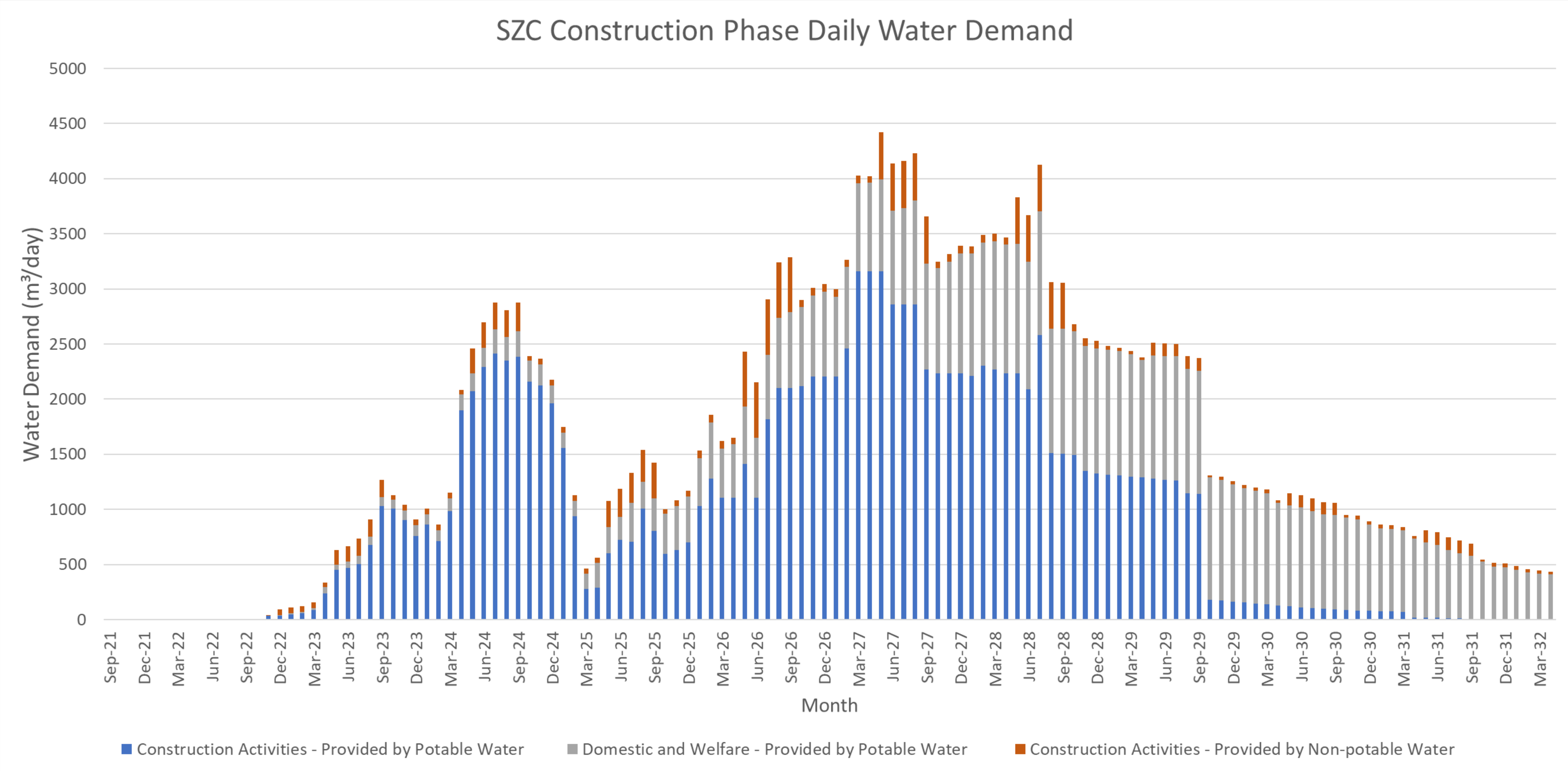
The water demand on SZC has been estimated as accurately as possible using past projects such as Hinkley Point C (HPC) as a benchmark. The construction peak of 4Ml/day represents a credible upper limit. Where possible, the demand has been reduced by allowing for water recycling in construction activities and by identifying activities that could be supplied by non-potable water. The potable water required for SZC is proposed to be provided through a three phased approach:

- Phase 1 – Water truck supply.
- Phase 2 – A temporary local desalination plant.
- Phase 3 – NWL transfer main from Barsham WTWs.

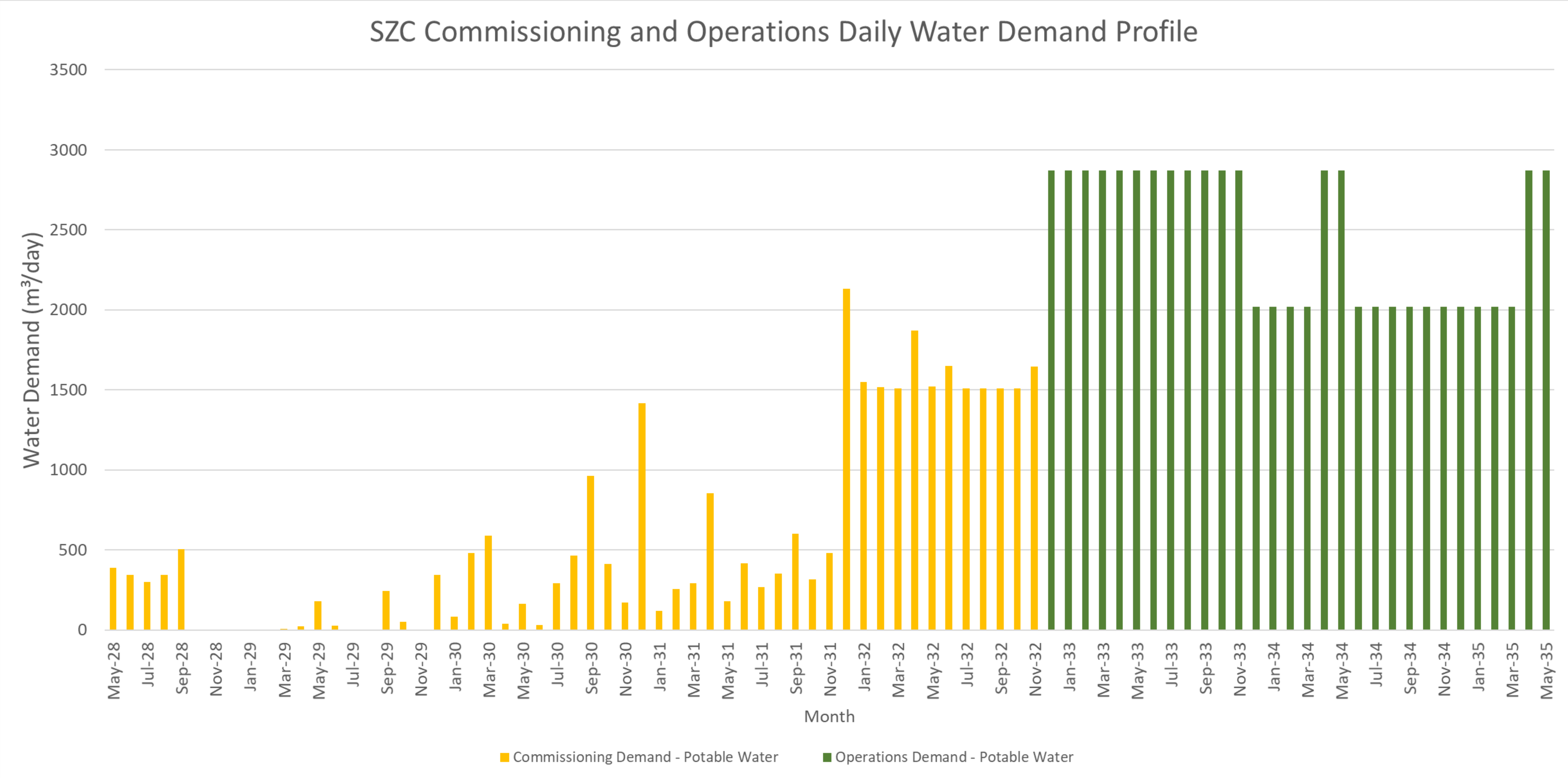
Opportunities to capture and reuse non-potable water on site have been investigated, and specific construction activities have been identified that do not require potable quality water. Feasible non-potable water sources such as re-use of treated SZC foul water and treated SZB foul water have been identified as a potential means to supply these construction activities. Furthermore, estimated potable water demand has been reduced through identifying water reduction measures that can be used in site offices and accommodation on site.

Appendices

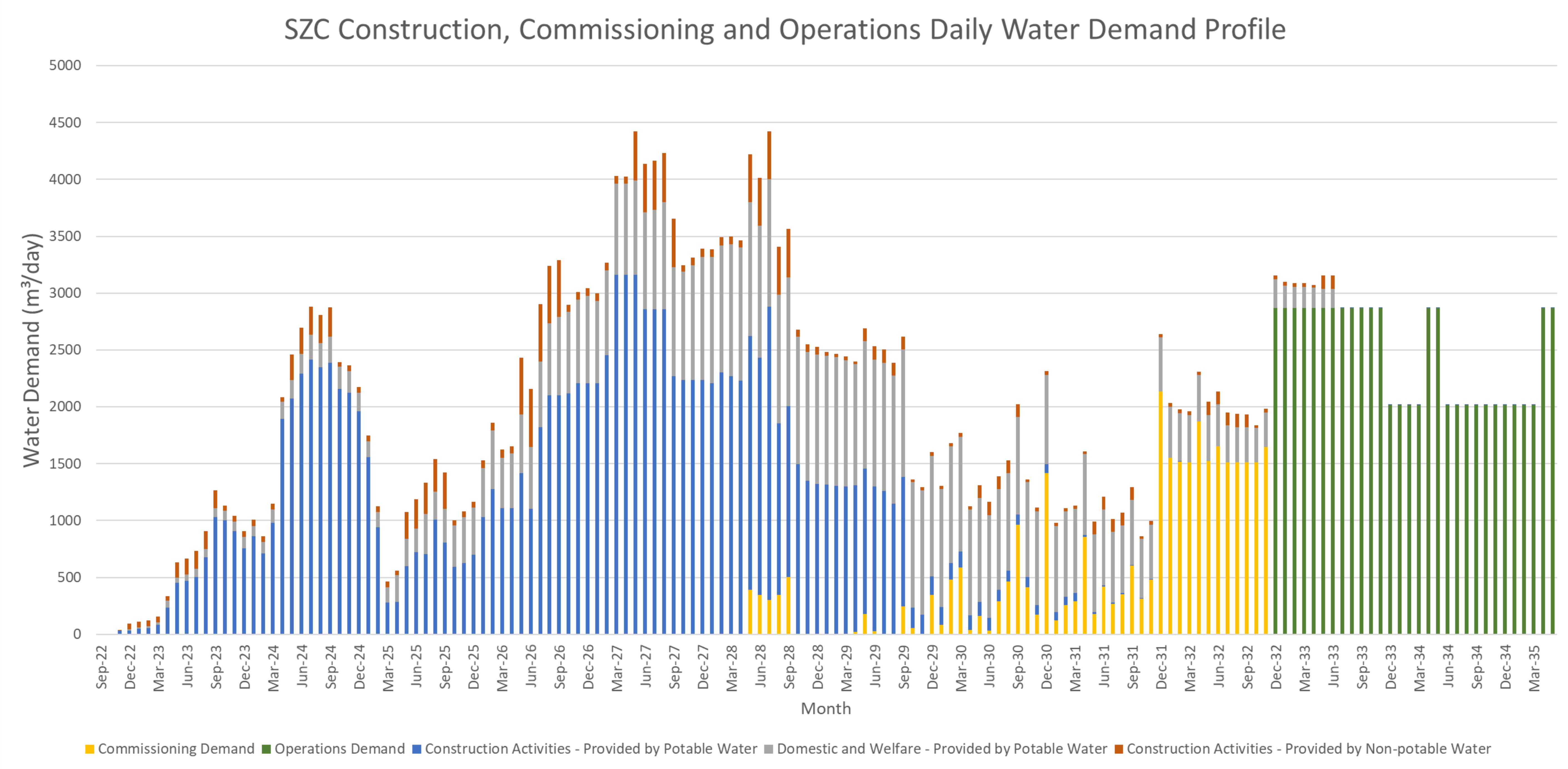
Appendix A. Construction Phase Water Demand Profiles

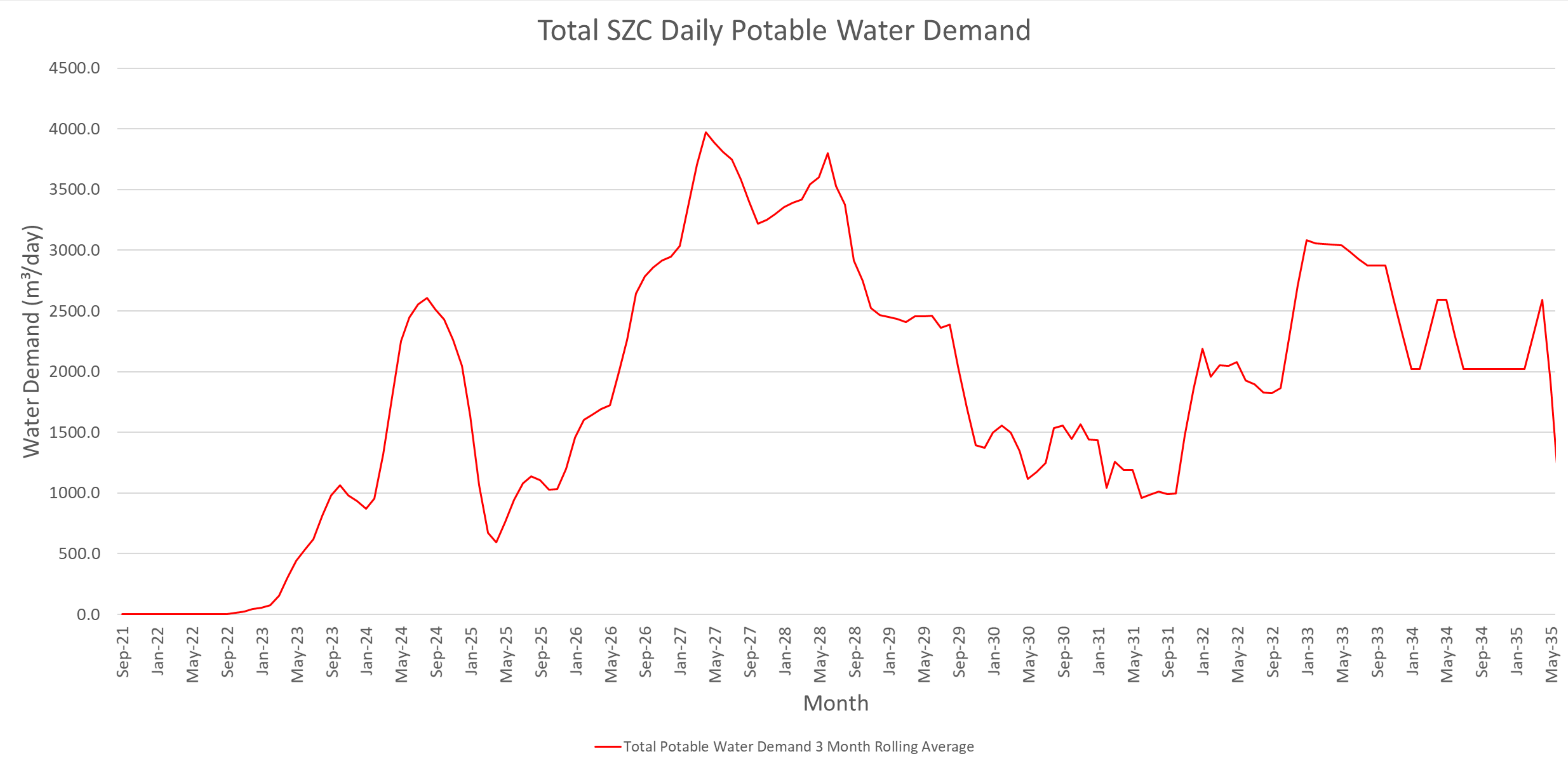

SZC Construction Phase Daily Water Demand
Water Demand (m³/day)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Sep-21 Dec-21 Mar-22 Jun-22 Sep-22 Dec-22 Mar-23 Jun-23 Sep-23 Dec-23 Mar-24 Jun-24 Sep-24 Dec-24 Mar-25 Jun-25 Sep-25 Dec-25 Mar-26 Jun-26 Sep-26 Dec-26 Mar-27 Jun-27 Sep-27 Dec-27 Mar-28 Jun-28 Sep-28 Dec-28 Mar-29 Jun-29 Sep-29 Dec-29 Mar-30 Jun-30 Sep-30 Dec-30 Mar-31 Jun-31 Sep-31 Dec-31 Mar-32
Month
Construction Activities - Provided by Potable Water
Domestic and Welfare - Provided by Potable Water
Construction Activities - Provided by Non-potable Water

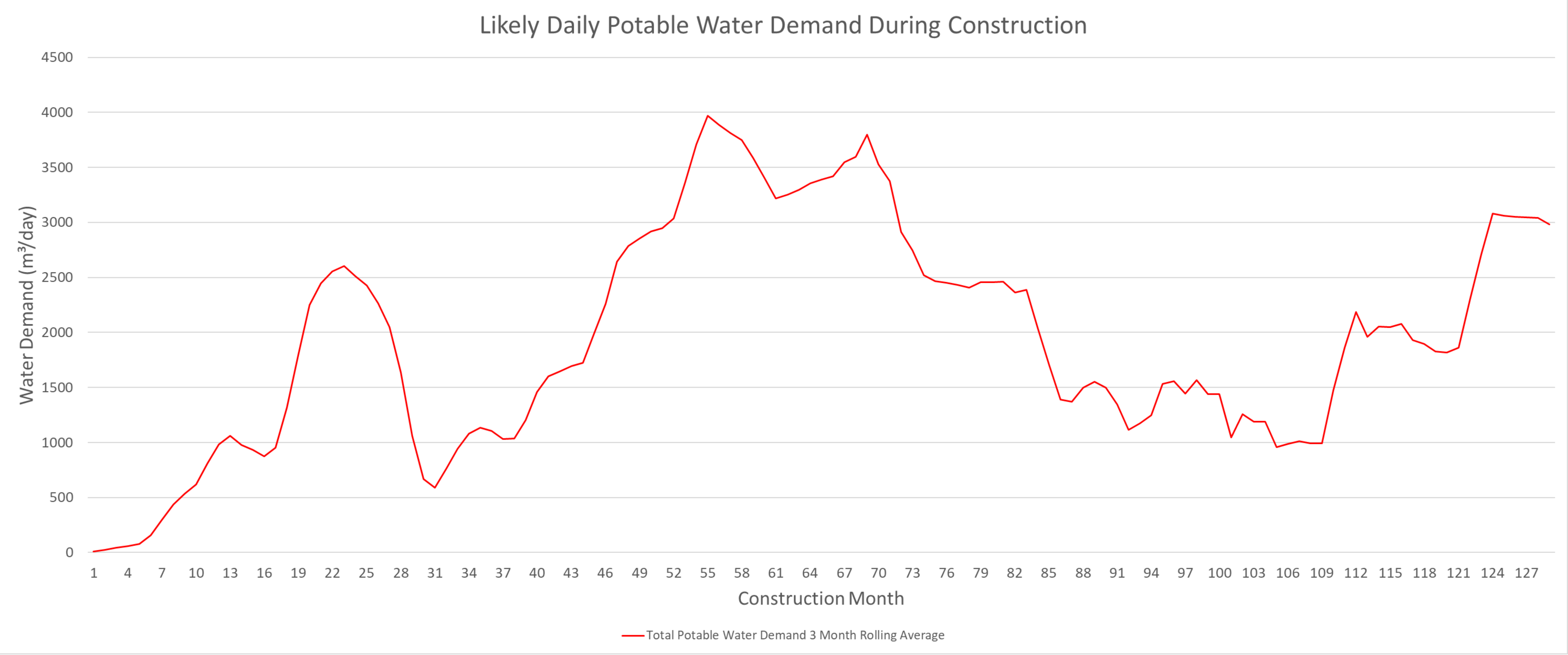
Appendix B. Commissioning and Operational Water Demand Profiles


SZC Commissioning and Operations Daily Water Demand Profile
Water Demand (m³/day)
3500
3000
2500
2000
1500
1000
500
0
May-28
Jul-28
Sep-28
Nov-28
Jan-29
Mar-29
May-29
Jul-29
Sep-29
Nov-29
Jan-30
Mar-30
May-30
Jul-30
Sep-30
Nov-30
Jan-31
Mar-31
May-31
Jul-31
Sep-31
Nov-31
Jan-32
Mar-32
May-32
Jul-32
Sep-32
Nov-32
Jan-33
Mar-33
May-33
Jul-33
Sep-33
Nov-33
Jan-34
Mar-34
May-34
Jul-34
Sep-34
Nov-34
Jan-35
Mar-35
May-35
Month
Commissioning Demand - Potable Water
Operations Demand - Potable Water

Appendix C. Integrated Water Demand Profile


SZC Construction, Commissioning and Operations Daily Water Demand Profile
Water Demand (m³/day)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Sep-22
Dec-22
Mar-23
Jun-23
Sep-23
Dec-23
Mar-24
Jun-24
Sep-24
Dec-24
Mar-25
Jun-25
Sep-25
Dec-25
Mar-26
Jun-26
Sep-26
Dec-26
Mar-27
Jun-27
Sep-27
Dec-27
Mar-28
Jun-28
Sep-28
Dec-28
Mar-29
Jun-29
Sep-29
Dec-29
Mar-30
Jun-30
Sep-30
Dec-30
Mar-31
Jun-31
Sep-31
Dec-31
Mar-32
Jun-32
Sep-32
Dec-32
Mar-33
Jun-33
Sep-33
Dec-33
Mar-34
Jun-34
Sep-34
Dec-34
Mar-35
Month
Commissioning Demand
Operations Demand
Construction Activities - Provided by Potable Water
Domestic and Welfare - Provided by Potable Water
Construction Activities - Provided by Non-potable Water


Total SZC Daily Potable Water Demand
4500.0
4000.0
3500.0
3000.0
2500.0
2000.0
1500.0
1000.0
500.0
0.0
Water Demand (m³/day)
Sep-21
Jan-22
May-22
Sep-22
Jan-23
May-23
Sep-23
Jan-24
May-24
Sep-24
Jan-25
May-25
Sep-25
Jan-26
May-26
Sep-26
Jan-27
May-27
Sep-27
Jan-28
May-28
Sep-28
Jan-29
May-29
Sep-29
Jan-30
May-30
Sep-30
Jan-31
May-31
Sep-31
Jan-32
May-32
Sep-32
Jan-33
May-33
Sep-33
Jan-34
May-34
Sep-34
Jan-35
May-35
Month
Total Potable Water Demand 3 Month Rolling Average


Likely Daily Potable Water Demand During Construction
Water Demand (m³/day)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
1 4 7 10 13 16 19 22 25 28 31 34 37 40 43 46 49 52 55 58 61 64 67 70 73 76 79 82 85 88 91 94 97 100 103 106 109 112 115 118 121 124 127
Construction Month
Total Potable Water Demand 3 Month Rolling Average