

## MEMO – WATER SUPPLY TO SITE – HAFF SYLVANNIA

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|------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>PROJECT NAME:</b>   | HAFF Sylvannia                                                                                                          |
| <b>PROJECT NUMBER:</b> | 250270                                                                                                                  |
| <b>ATTENTION:</b>      | Alex Murphy/Nicholas Hills (Homes NSW)                                                                                  |
| <b>FROM:</b>           | Daniel Lescano                                                                                                          |
| <b>DATE:</b>           | 1 April 2026                                                                                                            |
| <b>STATUS:</b>         | For Review                                                                                                              |
| <b>ATTACHMENTS</b>     | 250200 HAFF Sylvania Fire Services Review [P1]<br>SK-CS-006_SYL_Authority Infrastructure and Metering Requirements [03] |

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Dear Alex,

RE: Water supply to HAFF Sylvannia

This memo is intended to aid in assessing Condition 8 (Utilities) in Councils response to Homes NSW SSDA Application for the site above. The memo assesses the water supply and sewer demands from the proposed HAFF Sylvania development on Sydney Water infrastructure and evaluates whether the existing DN150 CICL water main on Pembroke Street has adequate capacity to serve the development without amplification.

Findings of the memo:

- Expected Water and Sewer demands on Sydney Water infrastructure (as per Sydney Water's March 2025 Average Day Water Use Tool (ADWUT) demand rates)
- Recommendation on mains amplification

Kind regards,



Daniel Lescano

Associate Engineer

## 1 CONTEXT

The development comprises 458 residential apartments across two components:

- Social Housing: 158 units in a single building (Ground + 6 levels) — 90×1-bed, 52×2-bed, 16×3-bed
- Market Housing: 300 units across five towers (A through E) — 67×1-bed, 174×2-bed, 59×3-bed

Note: per-tower unit splits within the Market Housing component have been estimated pro-rata by GFA from BVN drawing AR-AR-DA-01A-XX-02 (Development Matrix). These should be confirmed with the Architect once the unit schedule is finalised.

Water supply is proposed via a single connection to the DN150 CICL main on the south side of Pembroke Street, approximately 39 metres east of Port Hacking Road (per DBYD No. 50571019 and P&F Application No. 2214229).

It is proposed that water demands for the site are met via:

- 1 x 150mm connection to Sydney Water 150DN CICL water main on Pembroke road supplying domestic demands and fire-fighting water Social Housing
- 1 x 150mm connection to Sydney Water 150DN CICL water main on Pembroke road supplying domestic demands and fire-fighting water to Market Housing

**Note:** the new proposed connection arrangement for Fire Fighting water supplies requires early installation of the water connection and feed to the Market Housing lot. This feed is estimated at 170m which will result in 15kPa friction loss added to the system (to be accounted for compliance with AS.2419.1 Clauses 2.2.1 and 4.2.7.1.2)

## 2 REGULATORY FRAMEWORK

Below is a brief explanation of Sydney Water's requirements under current regulatory framework that may drive a decision to require an amplification of mains.

### 2.1 HOW SYDNEY WATER SIZES ITS INFRASTRUCTURE

Sydney Water plans and sizes its pipe network in accordance with the Water Supply Code of Australia (WSA 03), a national technical standard adopted by Sydney Water for all infrastructure design. The guiding principle of WSA 03 is that the network must guarantee a minimum service level to all existing and future customers connected to a main — not just the development seeking approval.

The minimum service levels Sydney Water must provide are:

- A minimum residual pressure of 15 metres of head at any customer's connection point for existing (retrofitted) reticulation mains, 95% of the time under normal demand conditions.
- A minimum residual pressure of 25 metres of head for customers in commercial or industrial areas, or on larger mains, under peak demand conditions.
- Flow velocities in water mains must not exceed 2.0 m/s during normal operation (with up to 4.0 m/s acceptable during a fire event).
- Head losses (pressure drop due to friction in the pipe) must remain below 5 m/km for pipes up to DN150 and 3 m/km for pipes DN200 and above.

When a new development connects to the network, Sydney Water models the additional demand it places on the main, and tests whether the minimum service levels for downstream customers — those connected to the same pipe further along the street — are still met. If they are not, the developer is required to fund the upgrade necessary to restore compliance. This is the basis of the NOR.

**Note:** Sydney Water's planning framework, and WSA 03, does not mandate that the public network guarantee water supply for private fire protection systems. The Code's minimum service obligations relate to domestic, commercial, and industrial water supply. Fire hydrant flow and fire sprinkler demand, while connected to the public main, are considered a private infrastructure matter. Sydney Water's obligation is to ensure the network can serve existing customers; it is not obligated to augment the network specifically to service a developer's fire system if an alternative compliant supply arrangement is available.

### 2.2 STANDARDS GOVERNING FIRE WATER DEMAND

The fire water demand for this project is set by two Australian Standards, which are mandatory under the National Construction Code (NCC):

AS 2419.1-2021 — Fire Hydrant Installations: requires 20 litres per second (L/s) sustained for 4 hours (432,000 litres total).

AS 2118.1-2017 — Automatic Fire Sprinkler Systems: requires 14.4 L/s sustained for 1 hour (43,200 litres total).

The combined fire demand is therefore 34.40 L/s, with a total volume of 339,840 litres required for firefighting.

### 2.3 SYDNEY WATER'S SECTION 73 PROCESS AND THE NOR

Before an Occupation Certificate can be issued, developers must obtain a Section 73 Compliance Certificate from Sydney Water. This process is managed through Sydney Water Developer Direct.

As part of the Section 73 process, Sydney Water conducts a formal assessment of whether the existing network can service the proposed development. If the network is found to be inadequate, the NOR sets out the infrastructure works required at the developer's cost before the certificate will be issued.

### 3 WATER AND SEWER DEMANDS

#### 3.1 METHODOLOGY

Average water and sewer demands are calculated in accordance with Sydney Water's own ADWUT demand library (March 2025 flow submission tool) at 630 L/dwelling/day for multi-unit residential at 30–60 dwellings per net hectare.

#### 3.2 WATER DEMAND

| Component      | Dwellings | Rate (L/dw/day) | ADD (kL/day) | ADD (L/s)   | Source |
|----------------|-----------|-----------------|--------------|-------------|--------|
| Social Housing | 158       | 630             | 99.5         | 1.15        | ADWUT  |
| Market Housing | 300       | 630             | 189.0        | 2.19        | ADWUT  |
| WHOLE SITE     | 458       | 630             | 288.5        | <b>3.34</b> |        |

The average daily potable water demand is 288.5 kL/day (3.34 L/s).

Applying WSA 03 peaking factors (PDF = 1.5, PHF = 2.0), the indicative peak hour demand is 10.02 L/s.

#### 3.3 SEWER DEMAND

| Component      | Dwellings | WW Factor | ADWF (kL/day) | ADWF (L/s)  | Source |
|----------------|-----------|-----------|---------------|-------------|--------|
| Social Housing | 158       | 0.75      | 74.6          | 0.86        | ADWUT  |
| Market Housing | 300       | 0.75      | 141.8         | 1.64        | ADWUT  |
| WHOLE SITE     | 458       | 0.75      | 216.4         | <b>2.50</b> |        |

Average dry weather wastewater flow is 216.4 kL/day (2.50 L/s) at a discharge factor of 0.75, consistent with ADWUT standard residential factors.

### 4 FIRE SERVICES DEMANDS

#### 4.1 TANK SIZING (PER JHA 250200 P1)

JHA's fire compliance review proposes 150 kL of combined fire water storage per lot, serving both sprinkler and hydrant systems via pump sets. The tank sizing is summarised below.

| Parameter                           | Value   | Unit | Reference                |
|-------------------------------------|---------|------|--------------------------|
| Sprinkler demand (incl. 20% margin) | 14.4    | L/s  | OH2 car park, 12 heads   |
| Sprinkler duration                  | 60      | min  | AS 2118.1                |
| Sprinkler volume (2/3rds per tank)  | 34,560  | L    | AS 2118.6 Cl. 2.8.5(a)   |
| Hydrant demand (2 × 10 L/s)         | 20      | L/s  | AS 2419.1 Table 2.2.5(B) |
| Hydrant duration                    | 240     | min  | 4 hours                  |
| Hydrant total volume                | 288,000 | L    | 20 L/s × 4 hr            |
| Mains infill credit (15 L/s × 4 hr) | 216,000 | L    | P&F max permissible flow |
| Hydrant tank storage (288k – 216k)  | 72,000  | L    | Gap-fill from tank       |
| Total tank volume required          | 141,120 | L    | Sprinkler + hydrant gap  |
| Tank volume provided                | 150,000 | L    | Per lot — compliant      |

The 150 kL tank exceeds the calculated minimum of 141.1 kL per lot. The design is compliant with AS 2118.6-2012 Clause 2.8.5(a) and AS 2419.1-2021 Clause 4.2.6.4.

## 4.2 KEY DESIGN ASSUMPTIONS

JHA's design relies on continuous mains infill at 15 L/s during the 4-hour hydrant event to credit 216 kL against the 288 kL hydrant volume. The 15 L/s figure is taken directly from the P&F maximum permissible flow. Sprinkler water is fully stored in the tank (no mains infill credited for sprinklers).

## 5 MAINS ASSESSMENT (DN150 CICL WATER MAIN ON PEMBROKE ROAD)

The existing main is DN150 CICL. Maximum flow at the WSA 03 velocity limit of 2.0 m/s is 34.4 L/s. The P&F report (App. 2214229) shows minimum normal pressure of 62 m head and maximum permissible flow of 15 L/s at 6 m head residual.

### 5.1 COMBINED FLOW ANALYSIS

The following table tests domestic demand (at both average and peak hour rates) combined with JHA's 15 L/s fire infill against DN150 velocity and P&F limits for each lot.

| Flow Condition                                                        | Flow (L/s) | Velocity (m/s) | P&F Check (15 L/s) | Notes                         |
|-----------------------------------------------------------------------|------------|----------------|--------------------|-------------------------------|
| Average day domestic                                                  | 3.34       | 0.19           | PASS               | ADD per ADWUT                 |
| Peak hour domestic (PDF×1.5, PHF×2)                                   | 10.02      | 0.58           | PASS               | WSA 03 Cl. 2.2.3              |
| ADD + fire infill (15 L/s)                                            | 18.34      | 1.07           | FAIL               | JHA design: concurrent infill |
| Peak hour + fire infill (15 L/s)                                      | 25.02      | 1.45           | FAIL               | Worst case: peak + fire       |
| Fire infill only (no domestic)                                        | 15.00      | 0.87           | PASS               | Hypothetical: fire-only draw  |
| DN150 water main constraints: 2.00m/s max velocity and 15L/s max flow |            |                |                    |                               |

### 5.2 FLOW ANALYSIS PER WATER CONNECTION

#### 5.2.1 SOCIAL HOUSING

| Flow Condition                                                        | Flow (L/s) | Velocity (m/s) | P&F Check (15 L/s) | Notes                         |
|-----------------------------------------------------------------------|------------|----------------|--------------------|-------------------------------|
| Average day domestic                                                  | 1.15       | 0.07           | PASS               | ADD per ADWUT                 |
| Peak hour domestic (PDF×1.5, PHF×2)                                   | 3.45       | 0.20           | PASS               | WSA 03 Cl. 2.2.3              |
| ADD + fire infill (15 L/s)                                            | 16.15      | -              | FAIL               | JHA design: concurrent infill |
| Peak hour + fire infill (15 L/s)                                      | 18.45      | -              | FAIL               | Worst case: peak + fire       |
| Fire infill only (no domestic)                                        | 1.15       | 0.07           | PASS               | Hypothetical: fire-only draw  |
| DN150 water main constraints: 2.00m/s max velocity and 15L/s max flow |            |                |                    |                               |

#### 5.2.2 MARKET HOUSING

| Flow Condition                                                        | Flow (L/s) | Velocity (m/s) | P&F Check (15 L/s) | Notes                         |
|-----------------------------------------------------------------------|------------|----------------|--------------------|-------------------------------|
| Average day domestic                                                  | 3.34       | 0.19           | PASS               | ADD per ADWUT                 |
| Peak hour domestic (PDF×1.5, PHF×2)                                   | 10.02      | 0.58           | PASS               | WSA 03 Cl. 2.2.3              |
| ADD + fire infill (15 L/s)                                            | 18.34      | -              | FAIL               | JHA design: concurrent infill |
| Peak hour + fire infill (15 L/s)                                      | 25.02      | -              | FAIL               | Worst case: peak + fire       |
| Fire infill only (no domestic)                                        | 15.00      | 0.87           | PASS               | Hypothetical: fire-only draw  |
| DN150 water main constraints: 2.00m/s max velocity and 15L/s max flow |            |                |                    |                               |

### 5.3 ASSESSMENT

Domestic demand alone passes all limits comfortably at both average (3.34 L/s) and peak hour (10.02 L/s) rates. Velocity is well within the 2.0 m/s limit in all domestic-only scenarios.

However, when the FH 15 L/s fire infill is added to domestic demand, the total mains draw exceeds the P&F maximum permissible flow of 15 L/s. At average day domestic (18.34 L/s total), the velocity is only 1.07 m/s (within limits) but the P&F capacity is exceeded. At peak hour (25.02 L/s), the P&F exceedance is more significant.

Critically, the P&F report reflects pre-development (existing) system demand. The development's domestic load is additive.

Two mitigating factors are proposed: first, a fire event coinciding with peak hour domestic demand is an low-probability scenario, the average day case is more representative of likely coincident conditions; second, the fire infill is a controlled float-valve fill to a storage tank, not an uncontrolled direct fire demand, and the infill rate can be mechanically limited below 15 L/s.

## 6 RECOMMENDATION ON MAINS AMPLIFICATION

Mains amplification is not recommended, subject to adoption of a reduced infill rate as described in Section 7.

The domestic demand alone (3.34 L/s average, 10.02 L/s peak hour) is well within DN150 capacity. The only scenario that creates a P&F exceedance is the coincident fire infill. By reducing the fire infill rate from 15 L/s to approximately 5 L/s or less, the combined mains draw can be kept within the 15 L/s P&F limit even at peak hour domestic demand — **provided the tank storage is increased to compensate for the reduced infill volume.**

It is worth noting the cost of amplifying mains is roughly **\$2,000/m** inclusive of building works, traffic management and ROLs and professional/admin fees.

## 7 ALTERNATIVE STORAGE SOLUTION — REDUCED INFILL

### 7.1 CONCEPT

The fire infill rate to the tank can be mechanically limited (via a controlled float valve or flow-limiting orifice on the DN150 property connection) to reduce the instantaneous mains draw during a fire event. The reduction in infill volume is compensated by increasing on-site tank storage. The relationship between infill rate, additional storage, and combined mains flow is shown below.

| Scenario                   | Infill Rate (L/s) | Add'l Tank (kL) | Total Tank (kL) | Domestic + Infill (L/s)    |
|----------------------------|-------------------|-----------------|-----------------|----------------------------|
| JHA current design         | 15.0              | 0               | 150             | 18.34 (avg) / 25.02 (peak) |
| Reduced infill to 10 L/s   | 10.0              | +72             | 222             | 13.34 (avg) / 20.02 (peak) |
| Reduced infill to 5 L/s    | 5.0               | +144            | 294             | 8.34 (avg) / 15.02 (peak)  |
| Reduced infill to 3.34 L/s | 3.34              | +168            | 318             | 6.68 (avg) / 13.36 (peak)  |
| Zero infill (full storage) | 0                 | +216            | 366             | 3.34 (avg) / 10.02 (peak)  |

### 7.2 RECOMMENDED CONFIGURATION

A reduced infill rate of approximately 5 L/s is recommended. This produces a combined mains flow of 8.34 L/s (average day) to 15.02 L/s (peak hour) essentially at the P&F limit under the unlikely worst-case peak hour + fire coincidence, and well within limits under average conditions.

This requires an additional 144 kL of tank storage per lot, increasing each lot's total fire tank from 150 kL to approximately 294 kL. The additional storage volume is 144 m<sup>3</sup>, which at a typical tank depth of 2.5 m requires approximately 58 m<sup>2</sup> of additional floor area.

The 5 L/s infill rate still provides 72 kL of mains-sourced water over the 4-hour hydrant duration, reducing the net tank storage increase.

A less conservative approach suggests an infill allowance of 10L/s (total average demand 13.34L/s) option, with 72 kL additional water storage required per lot; however this approach may not pass Sydney Water tests and it is not recommended to be pursued.



## 8 CONCLUSIONS

Below a summary of conclusions from this memo:

- Domestic water demand (ADWUT basis): 288.5 kL/day (3.34 L/s average). Peak hour: 10.02 L/s. Both well within DN150 capacity.
- Sewer demand: 216.4 kL/day ADWF (2.50 L/s).
- JHA's 150 kL fire tank design is compliant with AS 2419.1 and AS 2118.6 for each lot. Tank sizing is confirmed.
- The DN150 main has adequate hydraulic capacity for domestic supply. Velocity and pressure both pass.
- The only P&F exceedance occurs when JHA's 15 L/s fire infill is added to domestic demand. This is resolvable by reducing the infill rate and increasing tank storage.
- Mains amplification is not recommended. A reduced-infill storage solution (5 L/s infill, ~294 kL total tank per lot) avoids amplification while maintaining fire compliance.
- Early engagement with Sydney Water's UDP team and coordination with JHA on the revised infill rate are recommended before the Section 73 submission.