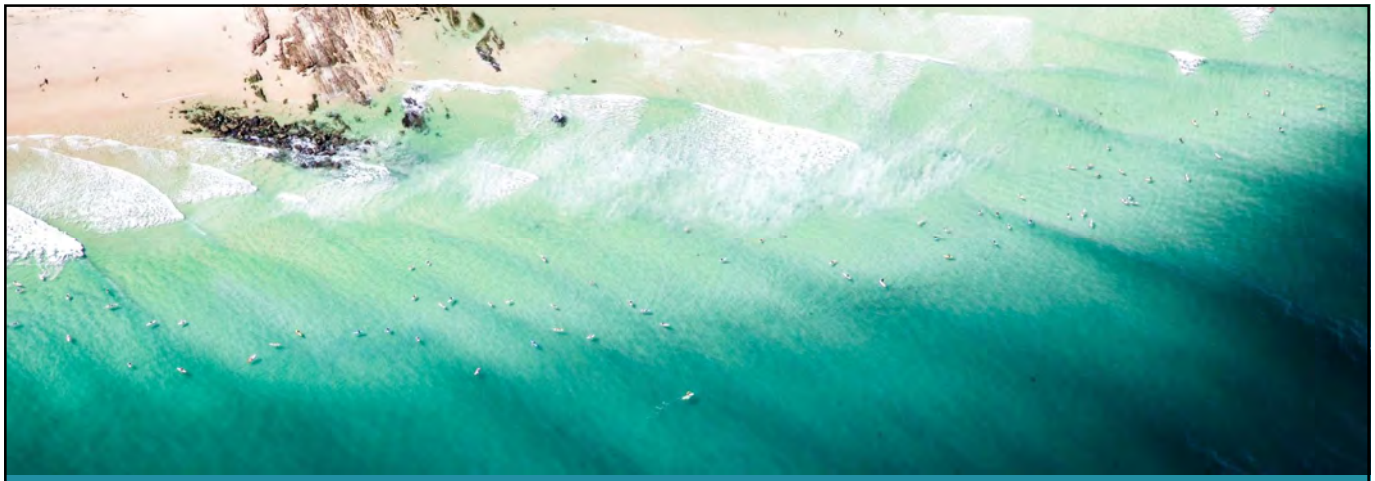


Contaminant Liabilities Associated with Infrastructure Delivery and Planning

DON'T UNDERESTIMATE THE POWER OF PFAS

CITY OF GOLDCOAST.

1

★★★½☆

How to Poison a Planet, Stan review: forever chemicals wreaking havoc

Mark Ruffalo and journalist Carrie Fellner reveal how American forever chemicals have affected an Australian First Nations community.

24 Apr 2024 13:06

Stephen A Russell

Commonwealth reaches $22 million settlement with Wreck Bay Aboriginal community over PFAS contamination

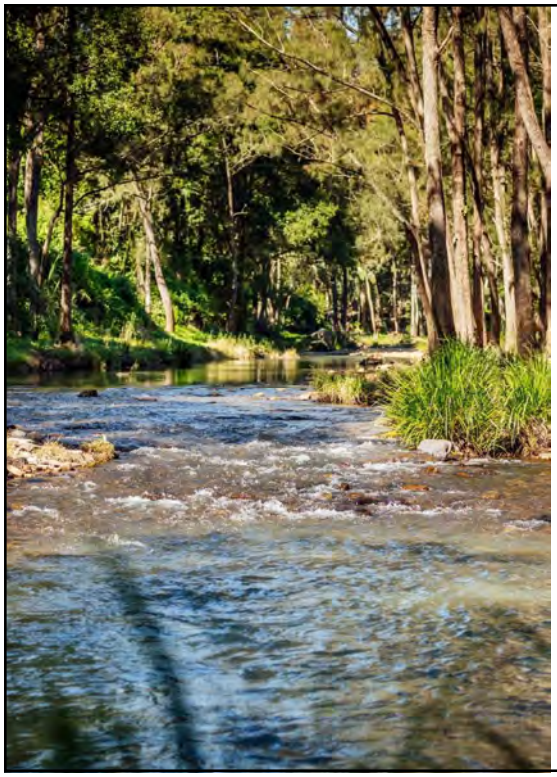
2

PFAS AND A GROWING CITY…

IMPLICATIONS FOR INFRASTRUCTURE UPGRADES

- The City of Gold Coast is expected to growing from ~600,000 to a population of 1Mil by 2046
- New department 'Infrastructure Gold Coast' needs to plan, deliver, maintain and operate the City's infrastructure to service current and future population
- The City's four sewage treatment plants (and other assets e.g. stormwater) are undergoing a series of upgrades and PFAS is currently factored in every single decision
- The City is spending rate payer (and tax payer) dollars in a CossieLivs crisis
- We aim to highlight the implications for Local Governments and Utilities dealing with PFAS

3



WHAT TO EXPECT FROM ME?

HOW THE GOLD COAST IS CURRENTLY MANAGING PFAS

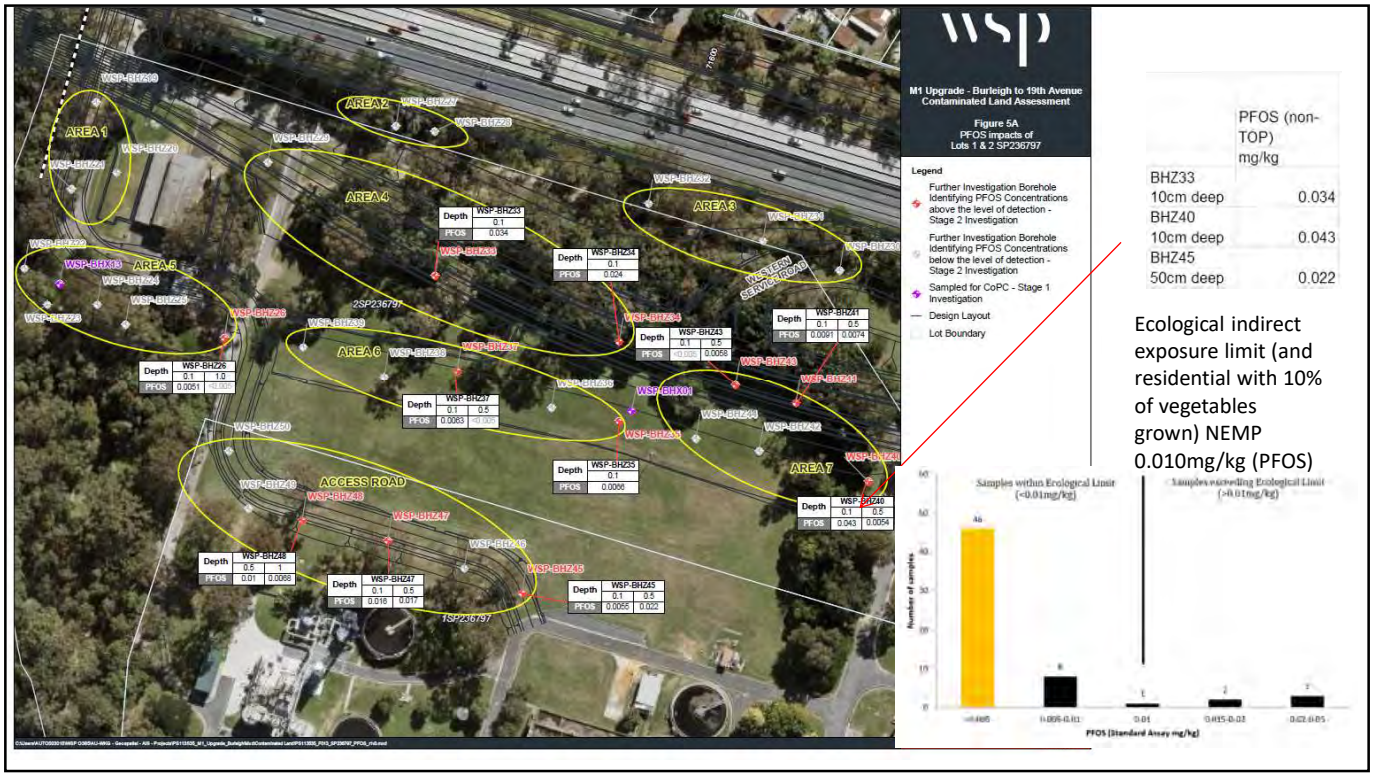
- I'm an environmentalist and Gold Coaster
- Trying to navigate 'must do' with 'can do' with 'what is best for our local and global environment' especially the way we spend money
- A bit of cynicism after a massive environmental investigation (million-dollar project showed low risk).
- Current approach from the City:
  - If the site being developed is on the CLR or EMR we need to test for everything (not just PFAS, BTEX etc)
  - If the site isn't listed, then don't test for things we don't expect to find (risk-based approach).

1) Planning implications for water projects,

2) Delivery implications for water projects,

3) Delivery implications for a storm water and light rail transport project.

4



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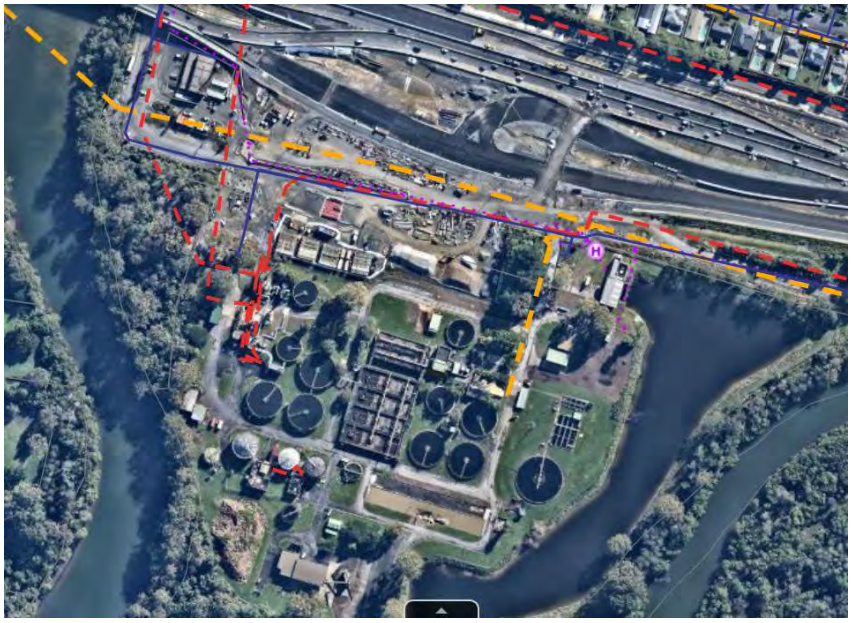
CASE STUDY 1: ELANORA STP BACKGROUND

- Train AB – 50 years old
- Train CDE – 38 years old
- Train F – 20 years old

- STP has no capacity to take any of the trains offline for refurbishment
- Growth in the Elanora catchment was initially planned to be transferred to Merrimac, but explored benefits of upgrading here
- Due to PFAS issues, needed to avoid digging up any soil or groundwater



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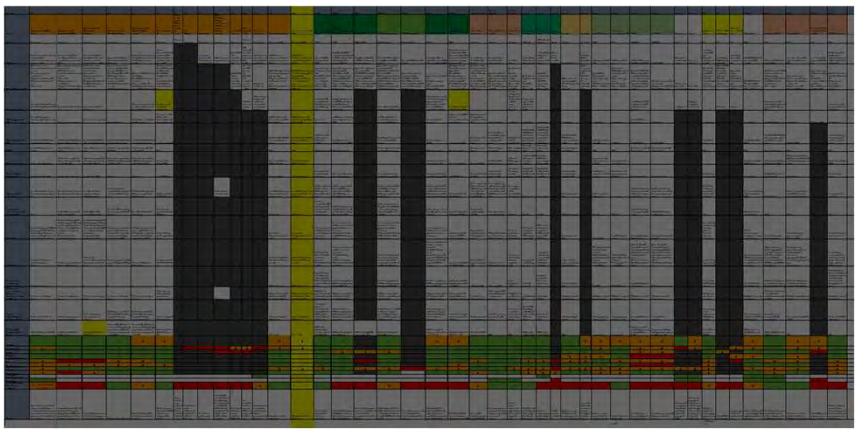
LONG LIST

- Isle Utilities engaged for the global tech scan
- 43 options/sub-options, considered and assessed
- Staging, location/space requirements, operational risk to implement, time aspect of implementation, strengths, weaknesses, etc.
- Nine options selected for further development
- Four shortlisted tech options

(Process Team Geek Out! Stantec, WSP, Council, GHD)



SHORT LIST: POTENTIAL OPPORTUNITIES - INTENSIFICATION

Site visits, online info-sharing sessions, chats with peers (thanks to everyone!)

INDENSE

MABR

PFAS Case Study 1: Leads to Innovation

- Combination I… Dense' by Veolia
- Biorea… …limited by the tank volume and bugs in the system MA… …ved aeration/nutrient removal
- Sec…dary clarifier capacity is limited by clarifier surface area and settling characteristics of the mixed liquor INDENSE = better settling floc
- Includes addition of a wet weather bypass for >3ADWF

CASE STUDY 2: BYPASS

We expected the bypass operational by the end of 2023, as per Business Case.

- Built to date: 160m
- On hold due to Groundwater: 170m

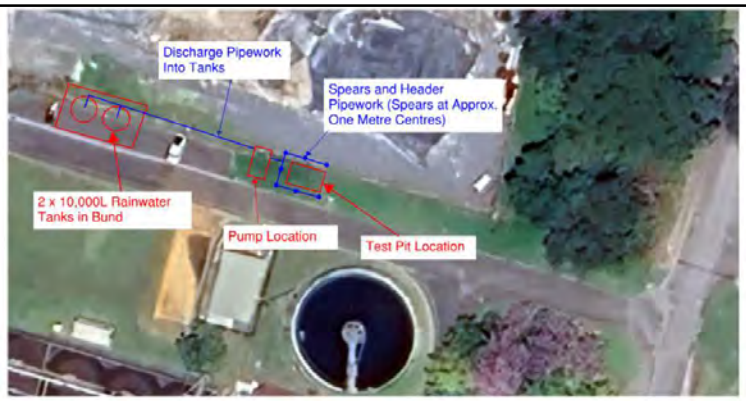


Figure 2 – Setup Location

Groundwater was identified as a risk in the project risk plan and the control was dewatering trial and additional groundwater monitoring

- 23/24FY wet season (408mm Jan-Feb) is influencing groundwater table levels compared to last year (180mm Jan-Feb).
- Estimate cost increase of liquid waste from $400K to $1M. Dewatering rate estimated circa 5000L/h. Disposal cost $0.74 per L.

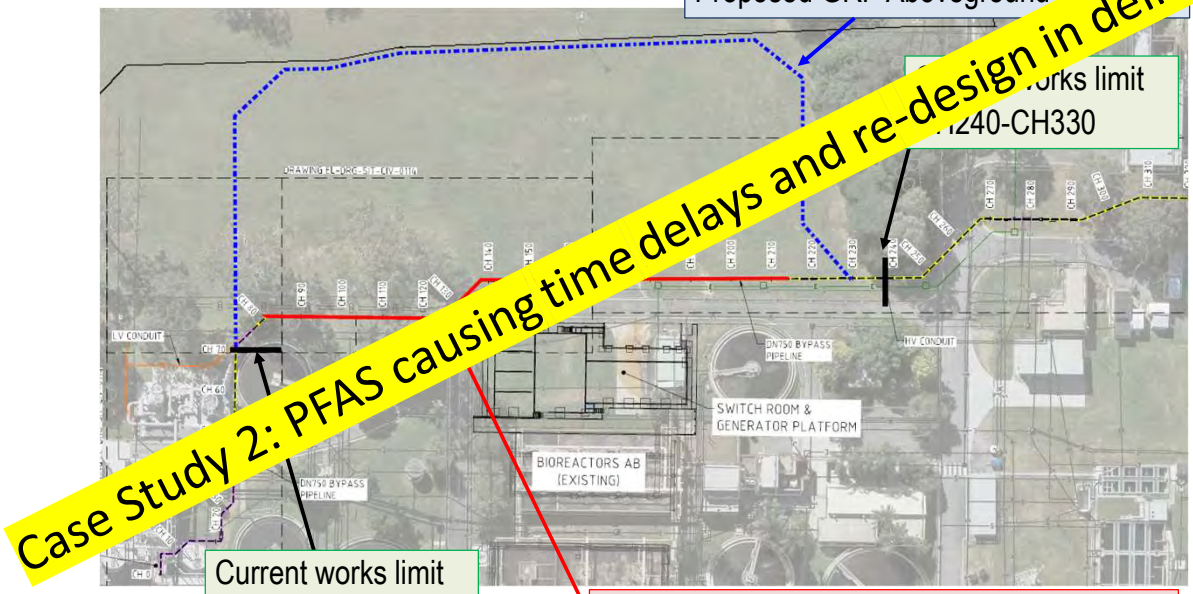
STATUS FROM PROJECT TEAM

- There is still no decision on way forward
- Our current stance is that we shouldn't be accepting any PFAS contaminated groundwater into our sewage or effluent infrastructure

The three options include:

- Option 1: Continue with current design and pay the additional costs (~$600K)
- Option 2: Return in dry season and:
  - Re-locate stormwater and raise pipe
  - Re-design to aboveground GRP 50m
- Option 3: Return on dry season
  - Re-design to aboveground GRP 280m

Bypass Delivery Recommendation Option 3



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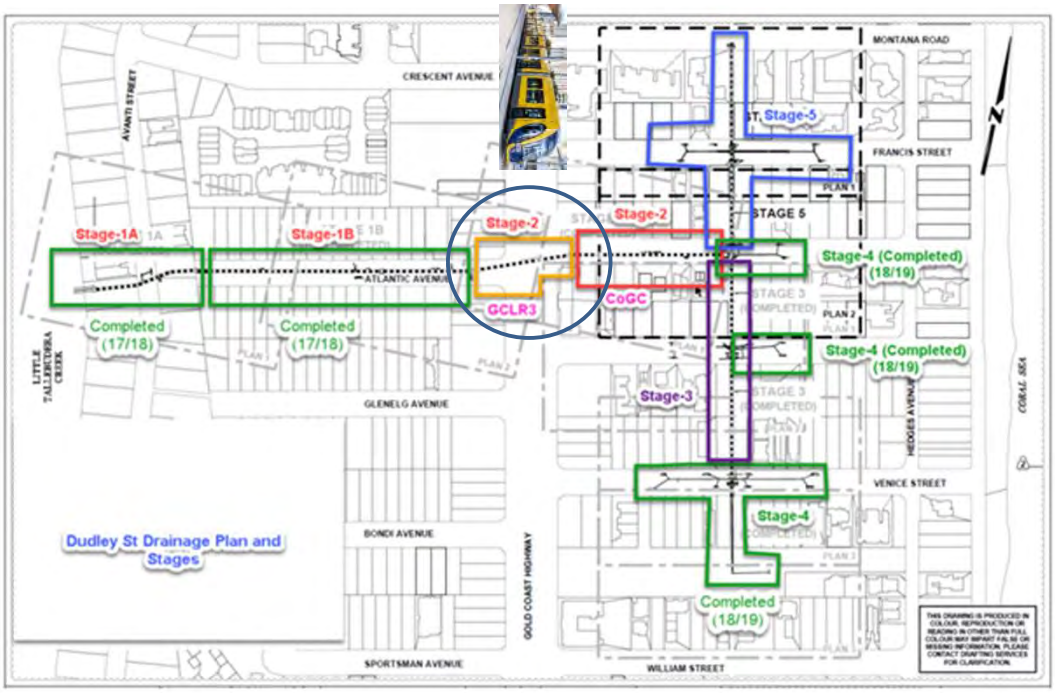
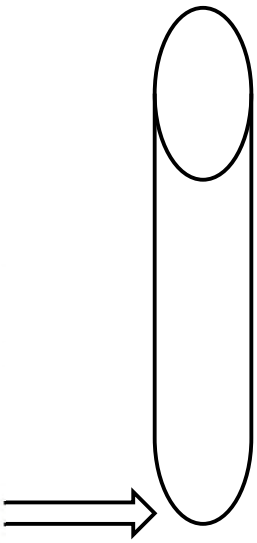
CASE STUDY 3: DUDLEY STREET STORMWATER UPGRADE





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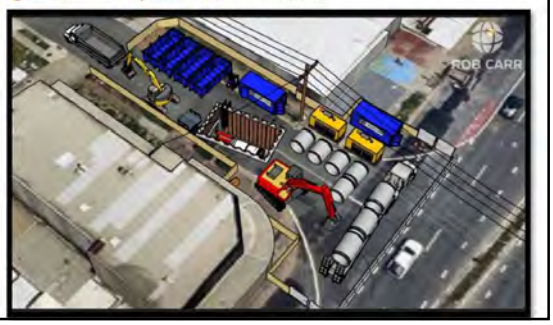
STORMWATER UPGRADE PROGRESS

- Dudley Street Stormwater Drainage Upgrade – planning and design completed (2016)
- Dewatering Management Plan (2017)
- Stage 2 approved for construction and tender documents prepared (2020)
- Budget transferred to TMR for GCLR3 to deliver Stage 2 crossing under GC Hwy only (2021)
- Gold Coast Light Rail Stage 3 (D&C) Dewatering Management Environmental Control Plan (2022)
- **PFAS was detected in groundwater 2022!!**
- PSP Memo Dudley Street PFAS Information Review (2022)
- Targeted Baseline PFAS Investigation Pipe-Jacking Alignment Atlantic Avenue to Dudley Street (2023)
- Dudley Street: PSP Technical Memo (2023).
- PSP GCLR3 - Dudley Street Pipe-Jack Arisings and Water Management Options Assessment reference Options (June 2023)
- Groundwater Monitoring Report – Dudley St (March 2024)
- At least $100K spent on monitoring and reports since 2022 and 2 years project delay

Figure 1.1 Proposed Stormwater Pipeline Location

Figure 1.2 Proposed Pit Shaft Schematic



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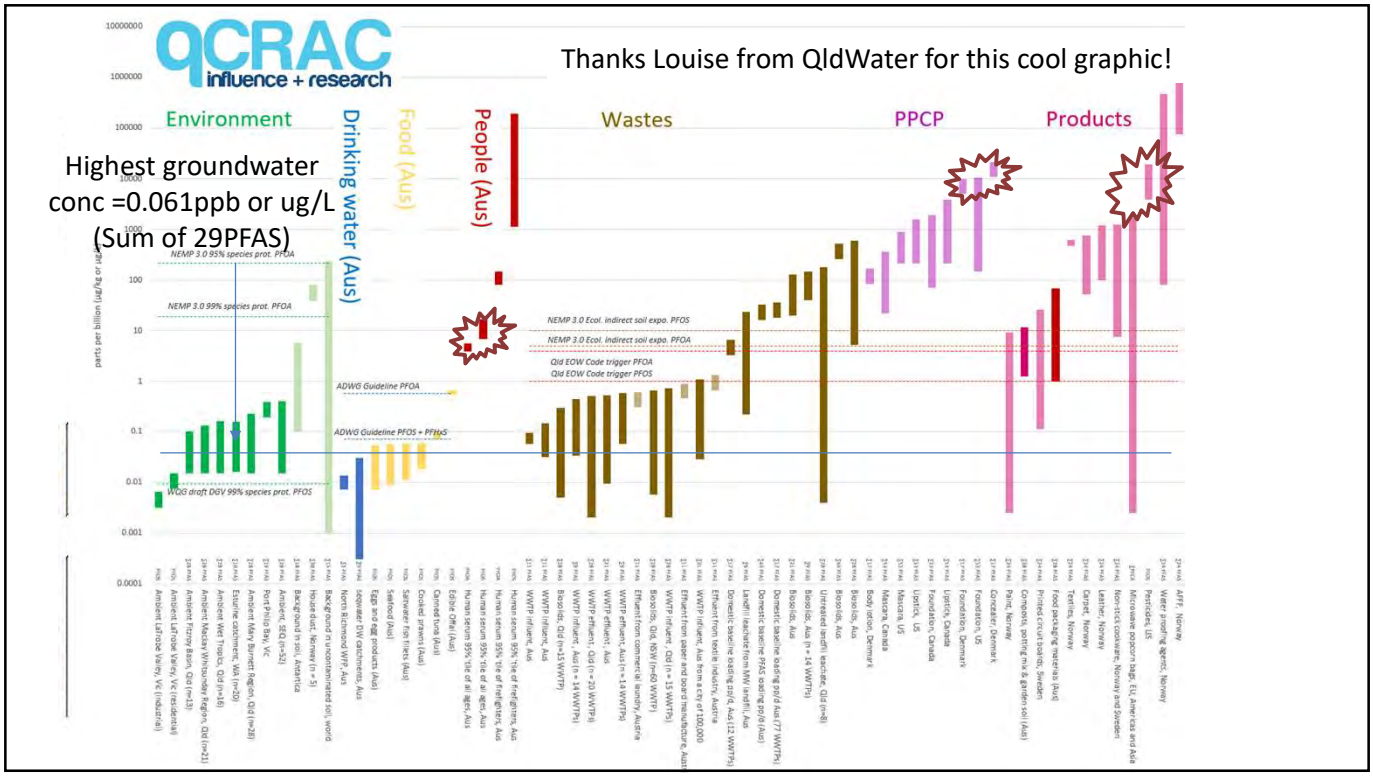

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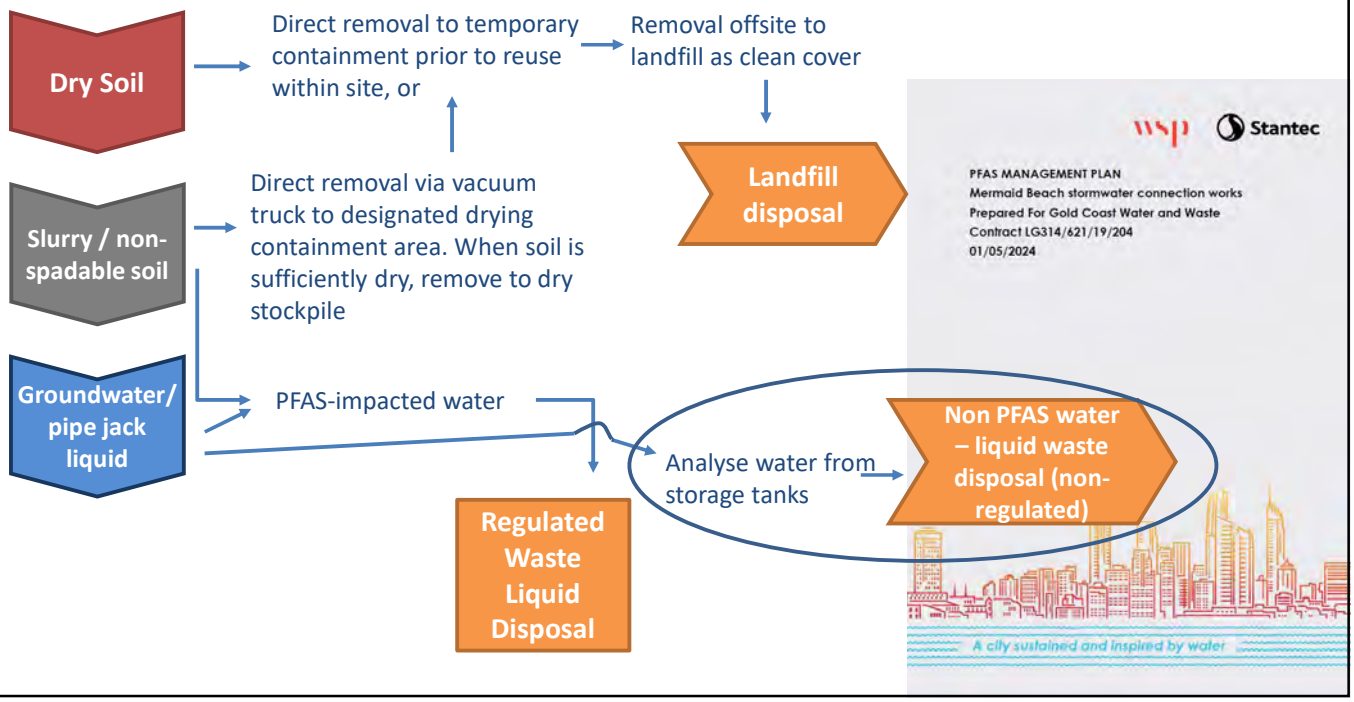
ACTION PLAN (APPENDIX B MATERIAL MANAGEMENT):



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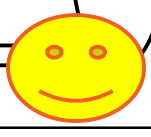
DUDLEY STREET UPGRADE OUTCOMES:

Case Study 3: Great DESI interaction, with lower risk and practical approach

Delivering the requ… time,
despite the d… detection, and
required …
The wat…able d… will determine the final
project cost for water disposal (fingers crossed !!)



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OVERALL:

PFAS is not an easy fix
It is very expensive to measure and manage
It can re-route projects and timelines
It's in a lot of everyday products at much higher than environmentally relevant concs
It is not always all bad (thanks to collaboration)
Keep it up water industry and qCRAC! ☺

Source Control is key (reduce imports)

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Acknowledging: All of my City of Gold Coast colleagues who helped build this story…
Dr Jemma Purandare, Andrew Stevenson, Mark Pease (Environment)
Alex Le Royer (Stormwater Guru)
Natashja Fernandez, Paul Gooley , Mark Hermann, (Delivery)
Dr Shao Yap, Christie Cole, Ryan Edge (STP Planning)
Many more from our Professional Services Partnership (Stantec and WSP)
Plus Louise Reeves, QldWater

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4.2 Drinking water EV water quality objectives

Table 5 Drinking water EV: Priority water quality objectives for drinking water supply in the water supply buffer area, including groundwater, before treatment

Indicator	Water quality objective [1]
Pesticides	Raw supplies: Refer to ADWG. Treated drinking water: Refer to ADWG.
PFOS+PFHxS	<35 ng/L
PFOA	<280 ng/L