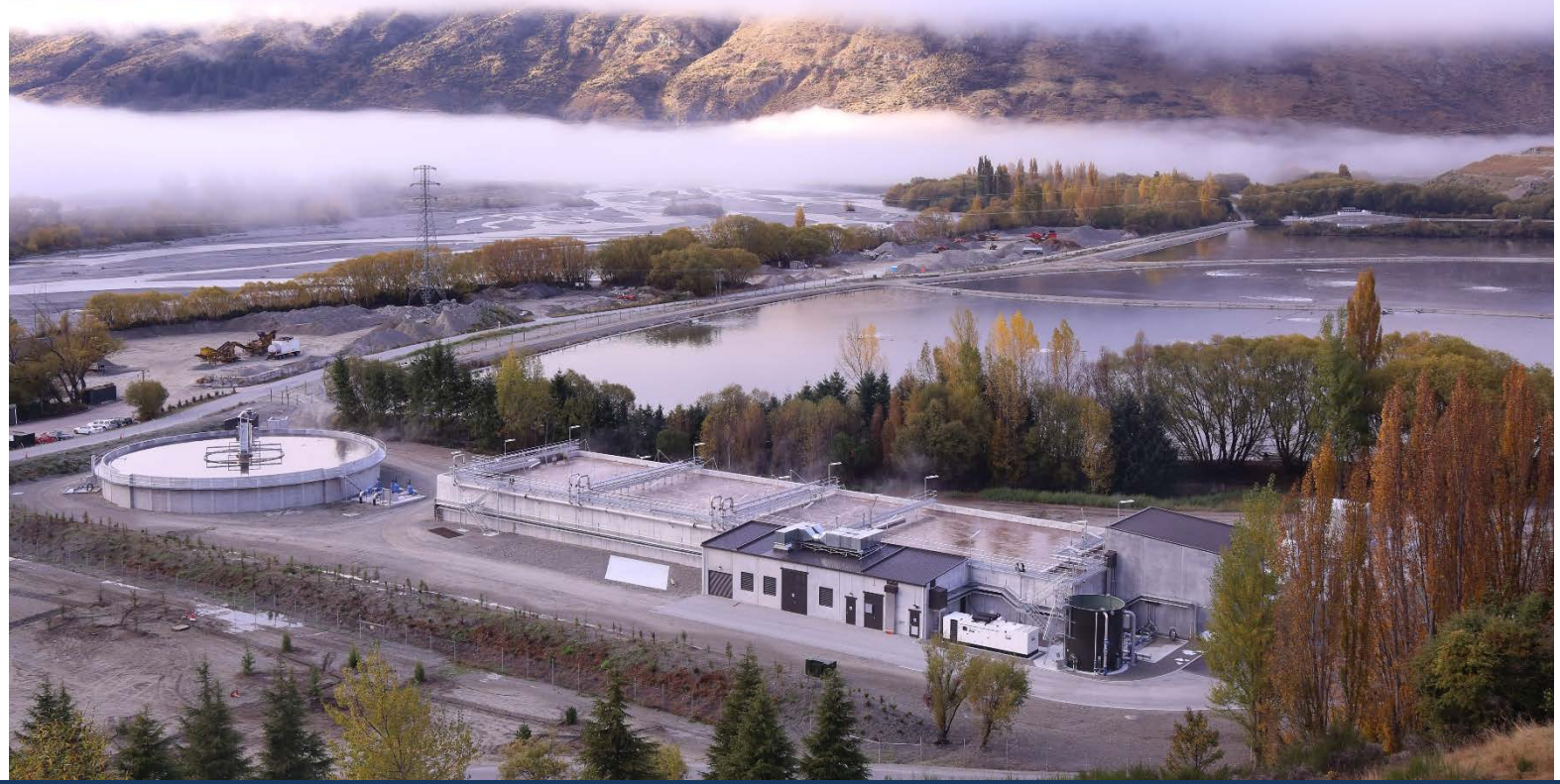
Project Shotover

What did we learn? What did we achieve?

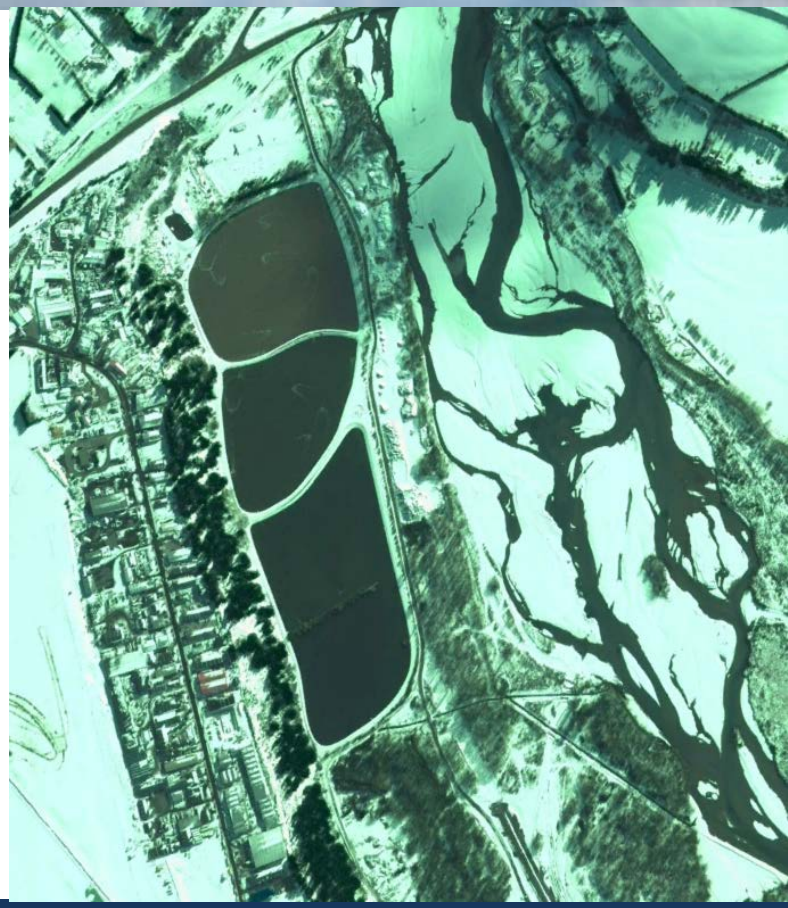


- John Crawford, Principal – Wastewater Engineering, Beca
- Simon Mason, Contract Manager – 3 Waters, QLDC

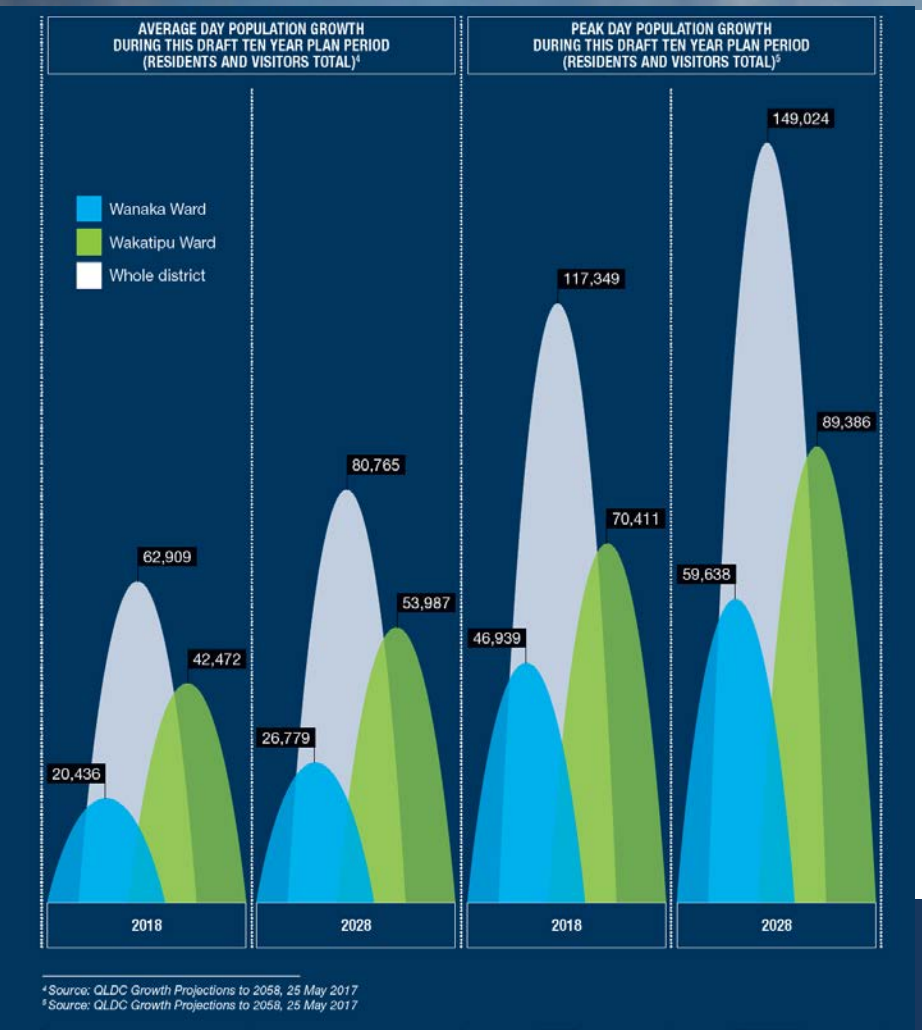
QUEENSTOWN LAKES DISTRICT COUNCIL

Why an Upgrade ?

- Grossly overloaded oxidation pond system
- Pristine receiving environment
- New consents ramp up WWTP performance expectations
- Rapid and major growth in & around Queenstown



Growth



[4] Source: QLDC Growth Projections to 2058, 25 May 2017
[5] Source: QLDC Growth Projections to 2058, 25 May 2017

- 34:1 International visitor to local ratio (annual basis)
- Major residential and commercial development underway and more planned
- Officially 2.6%. Actually more like 4.5% pa compounding

Procurement Model

- Client appointed advisory team throughout project
- Design, build, operate model (FIDIC Gold Book)
- Three short listed parties
- Prolonged evaluation/negotiation process

Timeline

Consent renewal application
July 2008

Consent orders signed off by Environment Court
May 2010

Technical, contractual and legal team appointed
Oct 2010

New Council puts project on hold

Procurement phase initiated
May 2013

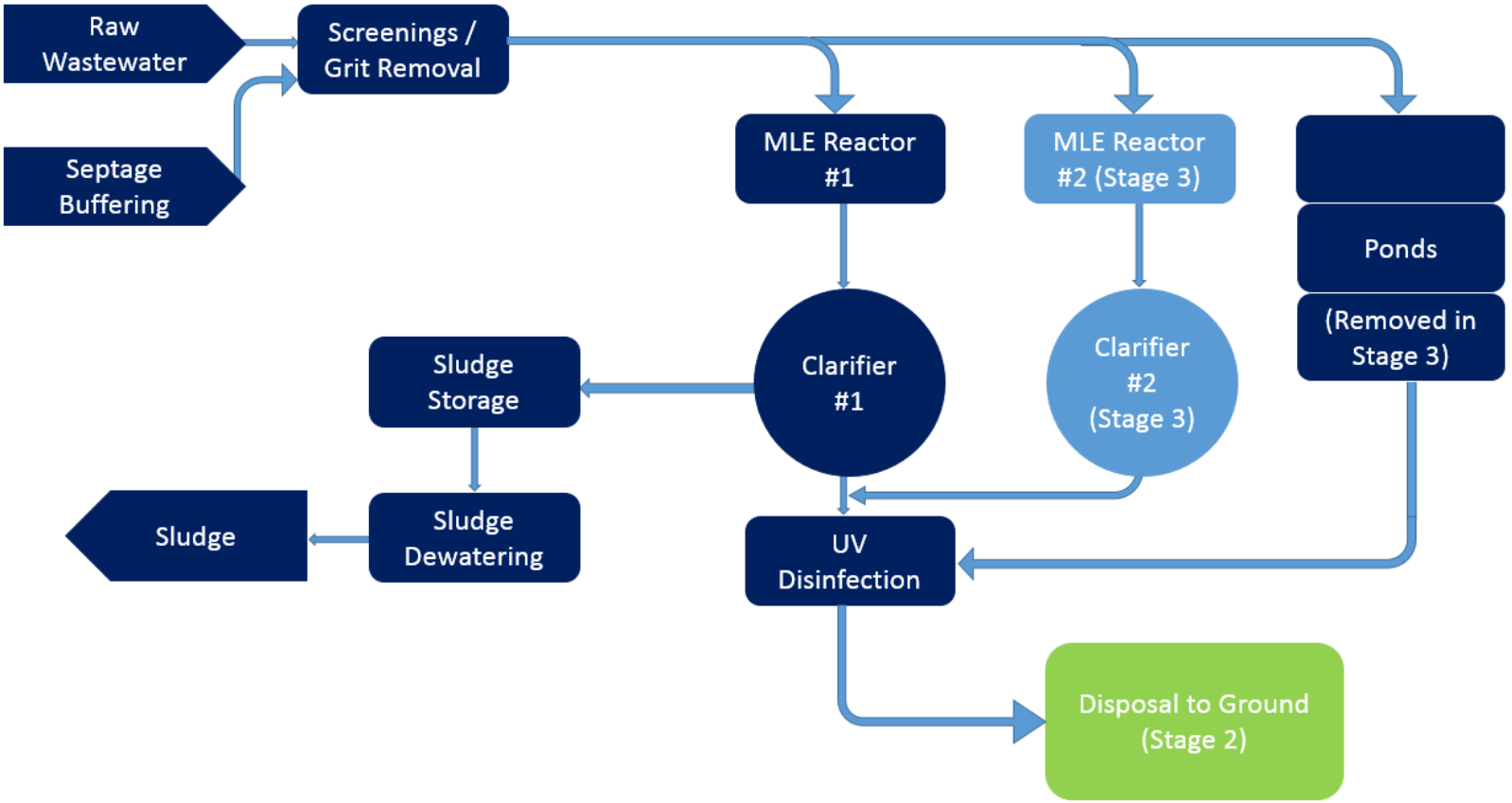
Work starts on site
May 2015

Biological commissioning complete
Feb 2017

Project/Plant Staging

- Staging based on consent TN threshold and projected growth rate
- Left Proposers to determine final staging configuration:
  - meet the consent conditions
  - minimum requirements for loading to 2026, and
  - most efficient use of existing infrastructure

Project/Plant Staging



The Upgrade

- Two process streams
  - 2/3 to new activated sludge plant
  - 1/3 through pond system
- Blended effluent stream to UV disinfection

MLE Process

- Overall reactor dimensions – 83 x 26 x 6m
  - Three Pre-Anoxic Zones (180 m^3 each)
  - Anoxic Zone (2,675 m^3)
  - Swing Zone (1,490 m^3)
  - Aeration Zone (4,760 m^3)
- 34m suction dredge clarifier

Other inclusions

- Grit removal & flow splitter
- Blower building (4 x 55kW blowers)
- Sludge dewatering (2 x centrifuges)
- Recycled water treatment & distribution
- Pond discharge pump station
- Odour treatment
- Septage reception facility

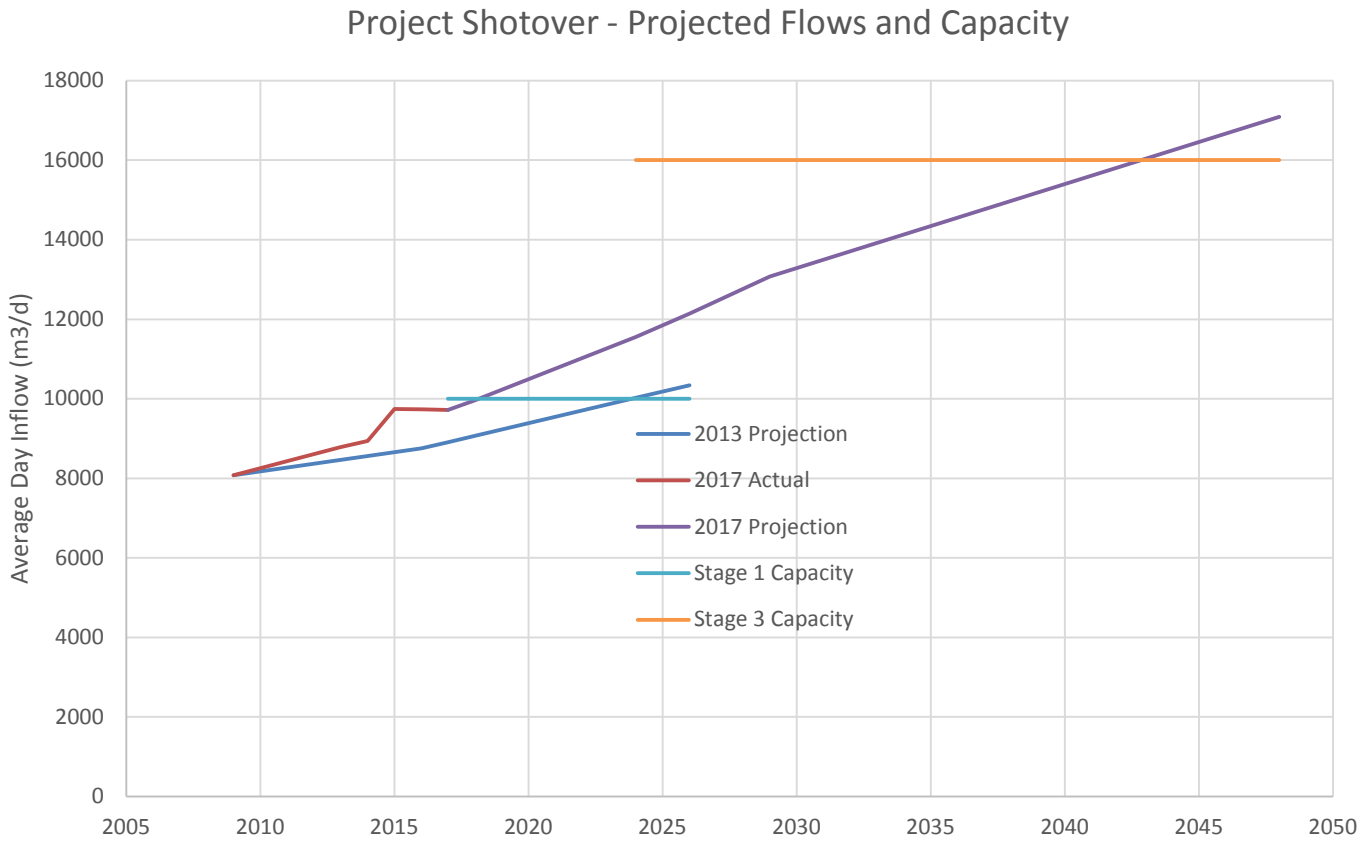
Design Process – Observations and Challenges

- Geotechnical design
- Peer reviews and client reviews
- Design workshops
- Vendor input

Commissioning and Performance

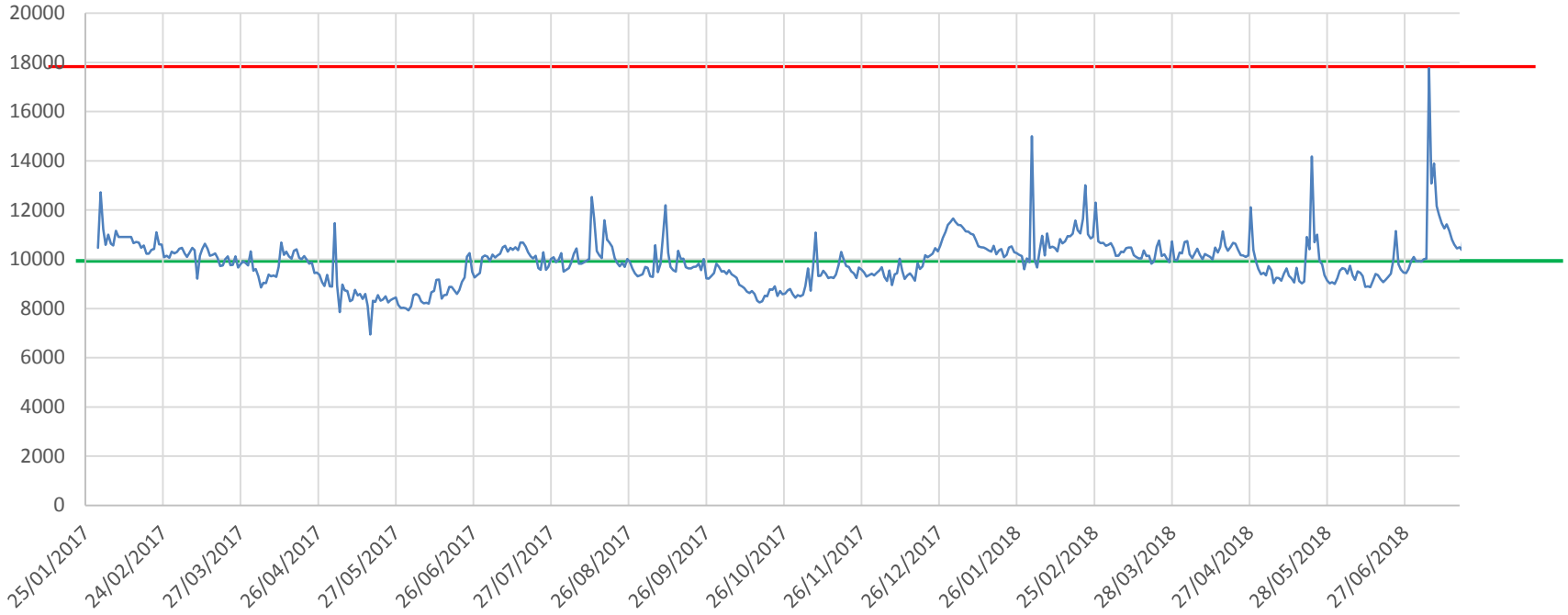
	Consent Limits		Clarifier Effluent		Blended Discharge Effluent	
	Annual Mean	Upper 95th%ile	Annual Mean	Upper 95th%ile	Annual Mean	Upper 95th%ile
BOD_5 (g/m^3)	30	50	-	-	6.0	11.8
TSS (g/m^3)	30	50	4.1	8.0	8.5	17
NH3-N (g/m^3)	15	25	0.1	0.3	10.1	16.4
TN (g/m^3)	20	35	5.5	7.6	19.4	28
TP (g/m^3)	7.5	10	-	-	4.4	6.9
E.coli (cfu/100ml)	260 geomean	260 geomean	-	-	19.9	80.0

What Actually Happened?



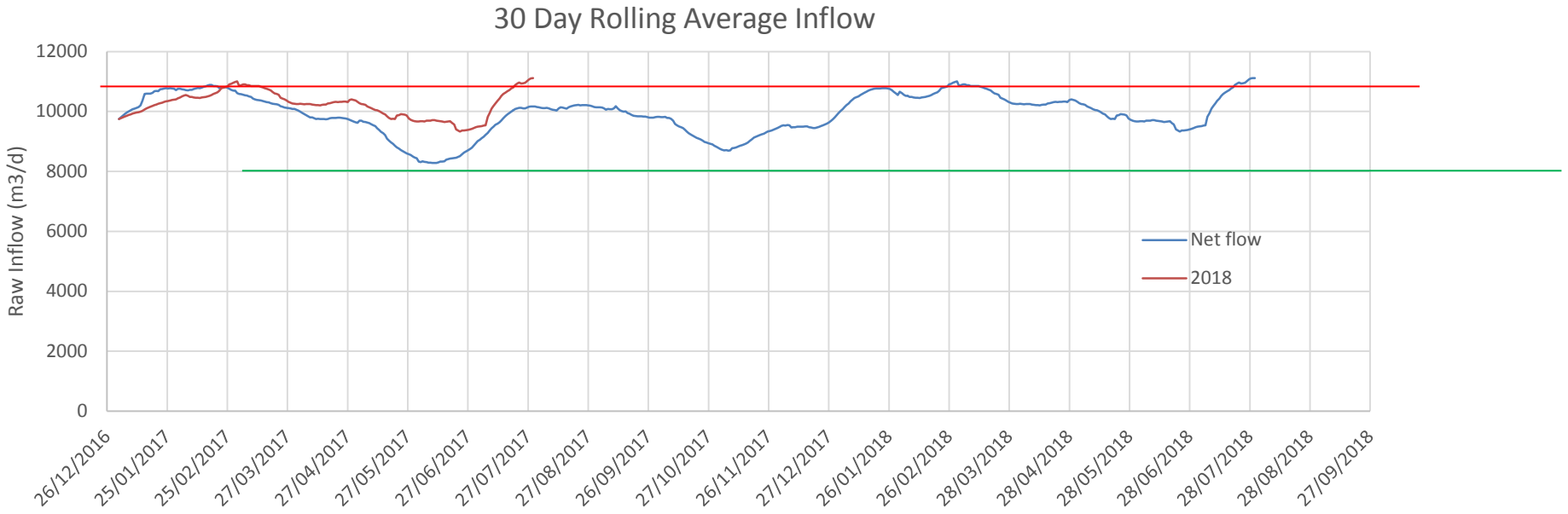
The GFC dissipated and the Wakatipu Basin became even more popular

Flow Variance – Wet Weather



- 1.7xADF During most significant event in 19 mths
- Typical rainfall events, approx. 30% increase in flow

Flow Variance – Seasonal



- Seasonal peak 1.2 x ADF
- Seasonal trough 0.83 x ADF
- i.e Very stable, low seasonal amplitude
- Red illustrates year on year growth

Lessons Learned

- Learnings from Project Pure
- Risk allocation
- Design Build – Pros & Cons

Conclusions

- Project Shotover has delivered well on QLDC's requirements
- D&B not a silver bullet


QUESTIONS?