



Western Australia

Plumbing Issues Update

13 October 2023

Agenda

Overview

Support to Customers and Homeowners

Safety

Establishing Causation

Industry Solution

Next Steps

Q&A

All financials are in AUD

Fletcher Building Limited



Summary

- Fletcher Building is committed to helping the industry get to the bottom of the plumbing failures that have arisen in Perth.
- We have been supporting customers and homeowners with our \$15m fund while causation, best fix methods and an industry solution are developed
- We dispute many aspects of BGC's presentation.
- There are no abnormal leak issues on the pipe installed on the East Coast of Australia. We are not aware of any issues from this resin in other geographies
- Evidence points to installation as the reason leaks are occurring in some houses in Perth, and that installation practices have deteriorated over time
- Our testing on the product is well advanced. Our tests to date continue to show that our Pro-fit product is code compliant and fit for purpose
- The evidence does not support the BGC extrapolation that all homes in Perth will be affected by these installation failures
- A product recall against this backdrop is not justified and would be an unnecessary impact on homeowners with perfectly good pipe and pipe installations. There are a number of less costly, less intrusive, and more rapid fix options for those homes that have been affected that will help
- BGC's estimated repair cost is sensationalist – scenarios that better align with the current evidence suggest that an industry cost to repair affected Perth houses could be a fraction of that, something in the order of \$50m to \$100m
- We will continue to work with the regulator and other stakeholders over the coming months to complete the fact base, agree the fix approach, and assist in developing an industry solution



How have we been approaching the plumbing failures

① Support for Customers & Homeowners, ② Establishing Causation, and ③ Industry solution

As an industry leader with deep expertise in pipe manufacture and performance, **Iplex is committed to its role in engaging with the industry** to identify the **cause of the failures and develop a pragmatic solution** as quickly and efficiently as possible and one that minimises inconvenience to the homeowner. Engaging with **29 builders and plumbers across Perth** (the only exception being BGC who refuses to do so). **Iplex has three workstreams** underway:



What have we been doing to support customers and homeowners

Given the complexity, Iplex established a \$15m fund to support the industry and homeowners while the issues are worked through.

\$15m

A

Inspect the failures and capture relevant data for the fix

B

Implement a suite of options for the builders and plumbers

- 29 builders registered for the Fund with >383 repairs completed (leak repair and ceiling re-pipes)
- To date, ~\$3m of the Fund has been spent. Of this, ~\$1.5m has been on repairs, so an average of ~\$4k per repair: this is a combination of ~\$1k for a simple leak repair and ~\$5k-\$6k with a full ceiling pipe replacement.
- The remainder of the Fund spent to date has been on investigating innovative fix solutions and management costs.
- BGC, for its own reasons, has not sought access to the Fund to support repairs
- Detailed data collected on ~170 homes and 3rd party data collected on a further ~100 homes => data for ~270 homes in total

The provision (\$15m) set aside for this interim support fund was made in FY23 and treated as a Significant Item. Iplex has not adjusted that provision but will continue to review treatment as facts and circumstances evolve.



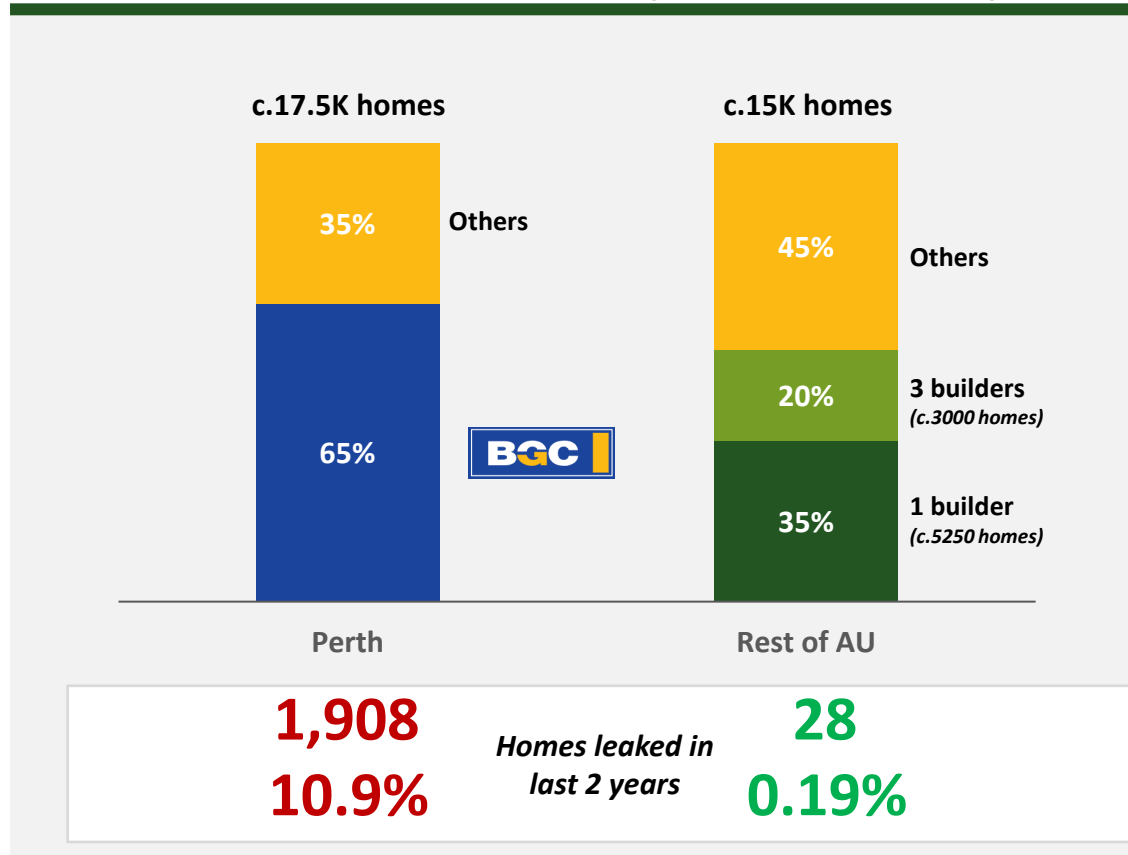
Safety is a core value to Fletcher Building and Iplex

- Safety is a core value to Iplex, and the well-being of homeowners is a clear priority for all participants in the home building industry
- We acknowledge that BGC has been advised that some homeowners have raised concerns that are said to be related to plumbing failures in their houses. BGC to date has refused to work with us to understand and effectively solve these problems, instead preferring to work on its own.
- We are however working with the rest of the Perth industry on this and are actively:
 - Helping builders expedite plumbing fixes
 - Using our interim Fund to support a larger scope of fixes than just the leak, including ceiling pipe replacements
 - Looking at other interim technologies such as leak detection devices
- Installations are required to have electrical circuit breakers which trip and cut off electricity if there is a fault such as a water leak impacting electric circuits and switches.
- In any event, any homeowner who has any safety concern should immediately contact their builder to rectify the matter.



The plumbing failures are a Perth issue – not a national issue

Homes built with Pro-Fit (mid 2017 – 2022)



- ➔ Similar volumes of Pro-Fit sold in Perth and rest of AU from 2017-2022
- ➔ Iplex has reached out to all our merchants and major plumbers / builders on the East Coast – they report no abnormal leak rates
- ➔ **Over the last 2 years, we have been made aware of only 28 homes in the rest of AU that have been impacted by plumbing failures involving Iplex pipe in homes built since mid-2017.**
- ➔ **Of these 28 homes, only 1 was determined to have a manufacturing defect with 8 yet to be determined/tested**
- ➔ BGC is misrepresenting the role of the failures it refers to in Victoria. These are known to Iplex and captured in our data. All tests completed on samples provided so far from that builder have not found any manufacturing fault.
- ➔ BGC’s assertions that there could be thousands of unreported leaks on the East Coast totally lack credibility – homeowners and customers would report them rapidly.
- ➔ **The plumbing failures are a Perth issue, not a national one**



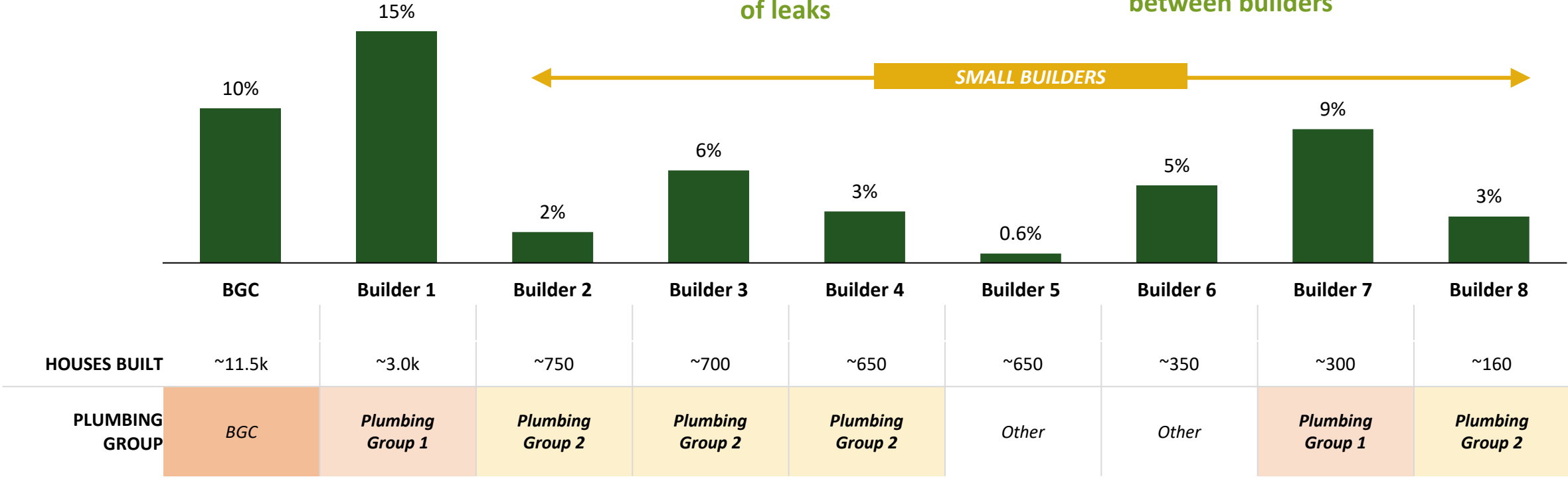
The abnormal plumbing failure rates are only occurring in the Perth area but rates of failure are very different across participants

Plumbing failure rates
 (% of plumbing failures¹ / homes built between 2017-22)

1 BGC and two plumbing groups account for **94%** of leaks

2 Significantly different plumbing failure rates between builders

← **SMALL BUILDERS** →



Note – Data as at 9th Oct; houses built with pro-fit are estimates from the builders
 (1) Homes impacted



We are consistently seeing four types of poor installation practices in Perth

BGC only referred to bending radius. However, there are multiple examples of different non-compliant plumbing practices in Perth that are of the type that generate leaks

1 OVER-BENDING

The Iplex Pro-fit Technical Guide states that the minimum bending radius be 10 times the outside diameter of the pipe. If this is not possible an IPLEX Pro-fit® elbow should be used.



Pipe overbent

2 INADEQUATE MOVEMENT

Iplex installation instructions state that care must be taken during install to allow for potential thermal movement of the pipe. Additionally, Australian standards require pipes to be supported with adequate brackets, clips or hangers with defined maximum spacings.



Pipe fixed in the wall through rigid mortar

3 POOR LAGGING

Plumbing standard AS/NZS 3500.1&4 and Iplex installation instructions state that pipes in chases shall be continuously wrapped with an impermeable flexible material.



Lagging not impermeable (and at times non-existent)

4 DAMAGE / WORKMANSHIP

Plumbing standards AS/NZS 3500.1&4 and Iplex installation instructions note that care should be taken to ensure pipes are not damaged during normal building activities.



Pipe bend across metal nail and kinked, resulting in a stress point

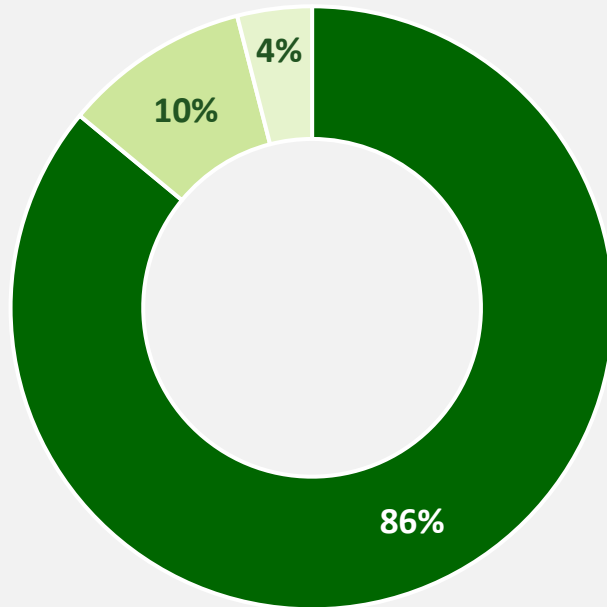


Iplex investigation has identified extensive evidence of poor installation

96% of homes have at least 1 installation failure. 86% have multiple installation failures

Plumbing installation failings seen across home inspections

Data as at 24th September



■ 2+ plumbing installation failures ■ 1 plumbing installation failure ■ Other issues

- Iplex has worked with Perth builders since the announcement of the interim Fund to support them in fixing and replacing pipe – frustratingly, BGC has refused to participate
- Iplex has a dedicated team of qualified plumbers who are available to attend each failure, on site and at the time of occurrence. When they are invited to attend, they collect data about that plumbing failure, including the associated plumbing installation practices
- Data has been reviewed by our external independent plumber expert. In addition, he has personally been to some affected homes and completed his own assessment
- The 4% of homes in the “other issues” group relate to either: failures not connected with the issue in question (e.g. rodent chew and fittings) or inaccessible pipes.



Further examples of installation non-compliant with standards and specifications

~92% of homes we have inspected / repaired have had non-compliant radial bends



Minimum bending radius must be 10 times the outside diameter of the pipe. All of the pipes shown here have been over-bent



Further examples of installation non-compliant with standards and specifications

Multiple issues of kinking, inadequate lagging and insufficient allowance for thermal expansion and movement



Kinked or damaged pipes, pipes overlapping; tight bend on back pipe



Pinch/pressure point caused by pegging creating localised high stresses



Kinking or damaged pipe not replaced per guidelines



Pulled hard against timber not allowing for lineal thermal expansion per guidelines



Iplex has observed a small number of failures on straight pieces of pipe. Each shows installation failure leading to the leaks

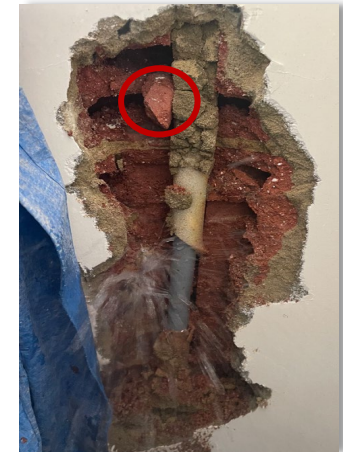
Iplex has heard claims that **plumbing failures are occurring 'on the straights'**. The implication is that leaks are occurring in straight pieces of pipes that are not under excessive strain due to over-bending.

Our inspections have revealed **only a small number of failures occurring on 'straights'**.

Where these have occurred, **most of them have pegging in wall chase which does not allow for adequate movement in the pipe.**

'Pegging' is a process that uses a fixed object to hold the pipe during installation which that installation instructions require to be removed prior to the system being put into service.

The assertion that leaks are occurring on straights, without an installation failure, is not believed to be correct.



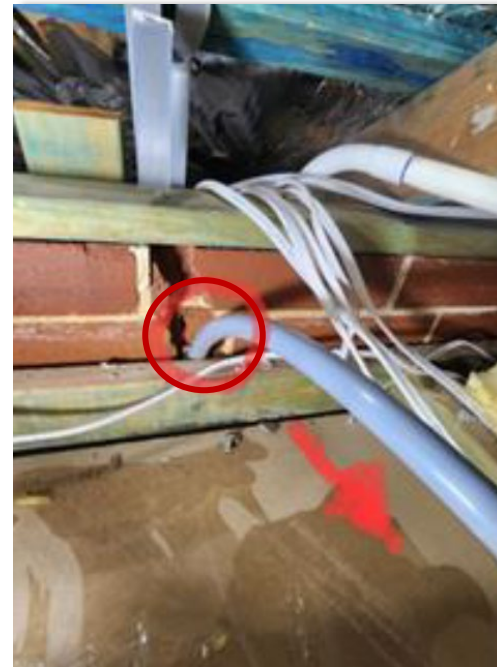
Inadequate movement and damage to pipe caused by pegging left in chase



A cursory look at BGC's presentation suggests a number of concerning plumbing installation practices in their affected homes



Lagging material (wrapping around pipe), which appears to be permeable – this is not compliant with the relevant Australian Standard



The bend of these pipes are likely to be outside of Iplex Pro-fit instructions (too tight), placing stress on the pipes



BGC presented photos of houses inspected on the Gold Coast which highlights key differences in building methods and reinforces the reasons for the failures in Perth

BGC PHOTOS OF HOUSES ON THE GOLD COAST¹



Timber frames allow the pipe to be installed within the open space of the wall cavity, allowing for **adequate movement due to thermal expansion and contraction**, while still being supported with sufficient clipping.



While tight bends are still visible in these images, the pipes are able to **freely expand and contract within the open wall cavity** during expected regular changes in the pipe's temperature and pressure (e.g. water hammer).



Holes cored in the top plate allow for **adequate movement** of the pipe due to thermal expansion and contraction without being held tightly by a mortar fill.

- Perth walls are double-brick and a chase is created in one of the brick walls where the pipe is laid and then mudded in
- If the pipe is not lagged correctly with an impermeable layer, the pipe is effectively fixed in place and **does not allow for adequate movement**, creating stresses on the pipe
- This is not in compliance with Iplex installation instructions, which state that care must be taken during install to allow for potential thermal movement of the pipe

¹ The bends in these photos appear to be non-compliant with Iplex's installation instructions and Iplex does not endorse or waive compliance by its statements above.



Why are the failures occurring in Perth and why now? (I)

The evidence is pointing to a deterioration in installation practices



POOR INSTALLATION PRACTICES THAT ERODED OVER TIME

- We know that poor installation can result in a shortened lifespan of pipe (rather than instant failure), which can take time to identify
- Critical analysis of market practice is required, as we believe the quality of installation has eroded at a time when (some) larger home builders were seeking to reduce costs
- Questions need to be raised as to whether the cost model for these plumbing groups rewards speed without quality oversight.

POOR PLUMBING GOVERNANCE PRACTICES, AND LOWERING EDUCATION & TRAINING STANDARD

- Further investigations are required to determine whether:
 - appropriately trained and skilled persons were used to conduct the installations
 - the WA plumbing self-certification system, combined with extremely low levels of compliance assessments, contributed to the problem. Iplex is aware that other states may have more robust certification policies in place
 - education and training standards are appropriate.



Why are the failures occurring in Perth and why now? (II)

The evidence is pointing to a deterioration in installation practices



ELBOWS NOT USED FOR TIGHT BENDS EVEN THOUGH REQUIRED BY BUILDING DESIGNS

- The Iplex Pro-fit Technical Guide states that the minimum bending radius be 10 times the outside diameter of the pipe. If that is not possible, an IPLEX Pro-fit® elbow should be used.
- Iplex's investigations reveal that inadequate numbers of Pro-fit elbows may have been purchased by Plumbers in Perth.
- Perth has the lowest ratio of elbows to pipe purchased in Australia.

PROCUREMENT PRACTICES HAVE CHANGED IN PERTH WITH A FOCUS ON SPEED AND COST REDUCTION

- Questions should be asked as to whether purchasing activities by builders contributed to the installation issues experienced.
- Iplex understands that some Group home builders began to purchase plumbing systems in bulk lots and delivered them directly to the home for the plumbing crew to use.
- It is unclear if appropriate materials were provided to plumbers to correctly install at each property, such as sufficient elbows.



Why are the failures predominately occurring in cold water pipe?

WA houses contain significantly more cold water pipes than hot, and cold water is used much more frequently

Effective Pipe Ratio Percentages in a House

Ratio of pipes installed in a home that carry cold water

~65%

How often cold water pipes are used, measured by usage of water

~71%

How often cold water pipes are used, measured by the number of usage cycles (i.e. times a tap/valve is turned on/off)

~85%
(or approximately equal to the failure rate)

The measurements and findings are based on assessments by Iplex's qualified plumbers. Only cold water pipes feed washing machines, dishwashers, toilets and evaporative air conditioners. These appliances have a high frequency of valve movements, incurring higher water hammer impacts through the pipes that feed them







- As of October 2023, approximately 85% of failures are occurring in cold water pipes.
- This percentage should be considered in the context of the high prevalence and typical usage of cold water pipes in homes.
- Investigations suggest that cold water does not appear to be influenced by other environmental factors.
- We are aware of misleading assertions regarding Pro-fit's WaterMark certification; it was certified by SAI Global Pty Limited on January 21, 2015, and this certification was held continuously until Pro-fit manufacturing ceased.
- SAI conducted annual surveillance audits to ensure that products, including Pro-fit, continued to meet relevant standards.
- Despite having the authority to do so, SAI never suspended or canceled Iplex's StandardsMark license or WaterMark certification; instead, they consistently recommended that "certification continues" in their annual audit reports.



Product testing program undertaken by Iplex

Iplex has used multiple external laboratories from across the globe, and several independent experts across polymer science, plumbing regulations and statistics professors

External laboratories

	COUNTRY	EXPERTISE	ROLES
	UK	<ul style="list-style-type: none"> Gel permeation chromatography 	<ul style="list-style-type: none"> Testing to characterise molecular weight and molecular weight distribution of material used in pipes
	NETHERLANDS	<ul style="list-style-type: none"> Standards testing, failure investigation Pipe Material Specialist 	<ul style="list-style-type: none"> Investigation of the mode of failure of in-service pipe samples that have leaked Tensile elongation testing
	AUSTRALIA	<ul style="list-style-type: none"> FTIR microscopy testing 	<ul style="list-style-type: none"> FTIR microscopy testing – polymer form transformation
	AUSTRALIA	<ul style="list-style-type: none"> Mechanical pipe testing including in accordance with AS/NZS 	<ul style="list-style-type: none"> Thermal and pressure cycling Hydrostatic pressure testing Testing in accordance with and in excess of Standards
	USA	<ul style="list-style-type: none"> Analytical Chemist 	<ul style="list-style-type: none"> Antioxidant testing
	SPAIN	<ul style="list-style-type: none"> Polymer properties including resistance to cracking 	<ul style="list-style-type: none"> Cracked round bar tests Flexural modulus testing Dynamic Mechanical Analysis

Independent experts

EXPERT	EXPERTISE
Robert LeHunt	<ul style="list-style-type: none"> Civil Engineer Polymer Engineer Failure investigations
Ross Brown – Hydraulic Engineer	<ul style="list-style-type: none"> Plumbing Hydraulic Systems Consultant
Prof. Graeme George AM	<ul style="list-style-type: none"> Leading polymer scientist
Dr Lucy Baker	<ul style="list-style-type: none"> Materials scientist Failure investigations
Prof. Kerrie Mengersen	<ul style="list-style-type: none"> Statistician



Testing approach taken by Iplex

Iplex has conducted a logical and comprehensive approach to its testing program

OBJECTIVE

To determine the root cause of failure

All pipes have shown the same type of failure with brittle radial fractures originating at the bore of the pipe, indicating tensile stresses caused predominantly by over-bending and inadequate allowance for movement and thermal expansion/contraction.
Failures are occurring at or near the apex of the bend.

STEP 1
ENSURE COMPLIANCE WITH AS/NZS STANDARDS

STEP 2
MECHANICAL PROPERTIES & IN-SERVICE TESTING REGIME

- Thermal stability
- Performance in WA conditions
- Flexural, stress and strain tests
- Hardness, impact, brittle tests

STEP 3
PIPE MANUFACTURING PROCESS TESTING

STEP 4
PIPE FAILURE ANALYSIS

- Analysis on fracture zone
- Combination of tests indicate bending stresses as a root cause for failure

STEP 5
TESTING TO EVALUATE BGC'S THEORY

- Comparative testing, including investigating the resistance of polymer to slow crack growth
- Molecular weight/molecular weight distribution



Testing program and results

Iplex has conducted a logical and comprehensive approach to its testing program

STAGE	TEST TYPE	PURPOSE OF TEST	#	INTERNAL	EXTERNAL	RESULTS
1	Hydrostatic Pressure Testing	Polymer strength and long term creep rupture strength	24	●	●	✓
	Dimensional Conformance	Ensure dimensions conform with Standards	154	●		✓
	Melt Flow Rate	Indicator of molecular weight	127	●		✓
2	High-Performance Liquid Chromatography Testing	Types and amounts of antioxidants	38		●	✓
	Oxidation Induction Time Test	Antioxidants remaining in pipe post failure	163	●	●	✓
	Thermal Cycling Testing	Performance in changing temperature conditions	4		●	✓
	Pressure Cycling Testing	Performance in changing pressure conditions	8		●	✓
	Flexural Modulus Determination Testing	Resistance to flexing/stiffness	6		●	✓
	Dynamic Mechanical Analysis Testing	Response to stress and strain and determination of glass transition temperature	5		●	✓
	Cracked Round Bar	Resistance of polymer to slow crack growth	6		●	✓
	Tensile elongation testing	Degree of "stretch" at the point of breaking, indicates level of ductility and flexibility	4		●	✓
	Pipe Brittleness Test / Reverse Bend Back Testing	Tests for signs of polymer embrittlement	130	●		✓
	Quantofix (Cu++)	Presence of copper ions	141	●		✓
Tensile Impact Testing	Energy absorbed by the material during impact prior to breaking, provides insights to behaviour under water hammer	7	●		✓	
3	Differential Scanning Calorimetry (Enthalpy)	Peak melt temperature. Confirm transition from Phase II to Phase I	34	●		✓
	Micro FTIR	Confirm transition from Phase II to Phase I	16		●	✓
4	Fourier Transform Infrared Spectroscopy CI testing	Assessing the degree / severity of oxidation	4		●	✓
	Scanning Electron Microscope (SEM) testing	Observes fracture surface for microscopic contaminants	4		●	✓
5	Gel Permeation Chromatography	Determines various molecular weight properties, incl. molecular weight distribution of the Polymer	26		●	✓
	Cracked Round Bar	Investigating the resistance of polymer to slow crack growth	6		●	✓



Resin change to Ylem managed with extensive QA process

Ylem has not experienced any issues of this nature elsewhere in the world

Overview of Ylem

- *Ylem is a major manufacturer of PB, alongside LyondellBasell, Mitsui Chemicals, Shandong Hongye Chemical and Chambroad Petrochemicals.*
- *Ylem supply raw materials around the globe to Korea, Japan, China, Europe, New Zealand*
- *Ylem has not experienced any issue similar to that occurring in Perth elsewhere in the world.*

Timelines of events

- *Iplex visited Ylem factory in 2016*
- *Iplex technical laboratory testing in Jan-April 2017*
- *First order of product April 2017*
- *First shipment arrives May 2017*
- *First manufacturing run July 2017*



Resin change process and testing

- *Iplex NATA technical laboratory undertook extensive qualification testing for Ylem resin in certifying compliance of extruded pipes in accordance with AS/NZS standards*
- *Process conducted was as follows:*
 - *Sample raw material received from Ylem*
 - *Melt flow rate & oxidation induction time testing*
 - *Samples of trial pipe tested to Australian Standard AS/NZS 2642.2, including pressure tests*
 - *Samples manufactured produced and tested*
 - *Eurofins (external lab) lab engaged to test trial pipes to Australian Standard AS/NZS4020*



Why did we stop manufacturing and supplying Pro-fit?

Pro-fit was an uneconomic product that we stopped manufacturing in 2021



HIGH MARKET SHARE ONLY IN WA

Iplex was only supplier for PB pipes in WA, hence relatively strong presence compared to other states



SMALL % OF SALES, UNPROFITABLE

Pro-fit represented <1% of Iplex's total sales in FY21, and despite interest in WA, had become unprofitable



FULL RANGE REVIEW OF PRODUCTS

A full range review recommended that hot & cold plumbing products be discontinued – this included Pro-fit



PRODUCTION CEASED IN MAR 2021

Manufacturing ceased in late 2021. The last sale to merchants occurred in 2022



The decision to cease production of Pro-fit was a **COMMERCIAL DECISION MADE IN 2021.**

Once leaks became evident in 2022, we recalled all remaining product from the market as a precautionary measure



Why do we consider that BGC's expert report is not credible? (I)

We and our leading global polymer experts consider the report from Dr Scheirs lacks credibility

SCHEIRS REPORT IS NOT CREDIBLE

Iplex's Independent Experts' view is:

BGC's assertions are based on an untested hypothesis from Dr Scheirs

The tests regime carried out by Scheirs are selective and artificial, and do not reflect actual conditions

From these tests Scheirs develops a flawed hypothesis that the difference he found in results supports his hypothesis

Iplex has had independent laboratories actually test the Scheirs/BGC hypothesis – the results from these tests disprove this hypothesis

TESTING METHODOLOGY

- The hypothesis put forward by BGC is just that – a hypothesis.
- It starts with the premise that Iplex's change in resin is the cause, and assumes there are fundamental differences between them.
- Dr Scheirs then attempts to find any difference between the pipes to justify the hypothesis. He tests and discounts anti-oxidants and manufacturing conditions. Finally, he lands on 'molecular weight distribution' based on a loose reading of patent literature. He conducts MWD tests and, reliant on what Iplex and its experts believe are aberrant results and a mis-reading of the patent literature, concludes that his hypothesis is correct.
- The tests he then undertakes compare failures in pipes made with Typlex resin and LYB resin using a testing regime that isn't designed to provide results to replicate actual installation conditions (such as overbending and excessive tightness). His test conditions were selective and artificial (including because, unlike normal conditions, they relied on highly chlorinated water) and bear no resemblance to what is happening in a home. He concludes that any differences between the pipes observed in the results of these tests must be a result of the differences in MWD. He does not show this to be the case, and his test results do not prove a link between cracking in pipes and his theory on MWD. Dr Scheirs also makes statements seeking to link small crystal size to pipe brittleness which has no scientific basis. In any event, his own testing results identify larger crystals in Typlex pipe, as supplied by Iplex. Iplex and its experts believe Dr. Scheirs' testing methodologies are flawed and so his findings cannot be relied on for any conclusions as to root cause.
- Notably, Dr Scheirs did not in fact test his hypothesis. Iplex has done so as part of its root cause analysis with tests conducted by independent laboratories, in conditions that deal with unused and failed pipes and various scenarios. It has undertaken comprehensive mechanical performance testing including in accordance with Australian/New Zealand or International Standards, and for pipes in bent configurations.
- Relevantly, those independent laboratory tests disprove the results seminal to Dr Scheirs' conclusions.
- Dr Scheirs avoided conducting tests measuring the performance of the pipes as defined by the AS/NZS2642.2 PB-1 pipe manufacturing standard. It follows that BGC's allegations that the resin change causes the substandard performance is unsupported. With that, the extrapolation BGC makes that all pipes will fail also is unsupported. Even Dr Scheirs does not go that far.



Why do we consider that BGC's expert report is not credible? (II)

We and our leading global polymer experts consider the report from Dr Scheirs lacks credibility

SCHEIRS TEST RESULTS ARE FLAWED

The Scheirs tests on MWD appear to be based on the wrong interpretation of the patent literature and aberrant test results

At any rate Iplex has had these very specialised tests carried out in an international laboratory in the UK

The results coming from these tests show the pipes manufactured with the new resin have a MWD in excess of minimum and are actually in the optimum range that BGC/Scheirs says is preferred

THE MOLECULAR WEIGHT DISTRIBUTION THEORY

- Much was made by BGC that, based on LYB patent literature, there is a "target range" for molecular weight distribution in all polybutylene pipes
- That is not what the patent literature says and there is no support for such a proposition
- A plain reading of BGC's' results showed that the pipe made with LYB resin and tested by Dr Scheirs was not in the range quoted by him from LYB's own literature. That suggests his entire report was based on aberrant test results - on the back of which BGC has formed incorrect conclusions
- The tests required to measure this issue are highly specialised and require a sensitive testing regime, which is why Iplex has sought results from an international laboratory in the UK qualified to perform these tests. As a result of Dr Scheirs' testing errors, BGC has been given results that are significantly lower than the results Iplex has obtained from an independent laboratory based in the UK who has many years of experience testing polyolefin materials such as PB1.
- In any event, based on the testing results it has received to date, Iplex believes the Pro-Fit pipe, when manufactured with Typlex resin, has a molecular weight distribution in excess of the "threshold" PD Index number of 3.5 that BGC says is necessary and most are in the "target range" that BGC believes is preferred.
- Iplex has said that it is awaiting final results and then a full report on what those tests mean, but those which Iplex has received from independent laboratories to date do not support BGC's conclusions



Why do we consider that BGC's expert report is not credible? (III)

We and our leading global polymer experts consider the report from Dr Scheirs lacks credibility

PRO-FIT TYPLEX PIPES ARE NOT MORE PRONE TO ENVIRONMENTAL STRESS CRACKING

ESC requires 3 conditions to be present one of which is an environmental factor – Dr Scheirs has not been able to identify one

Dr Scheirs report points to stress as the dominant factor causing early failure of the pipes

He also suggests that the radial bends of installed pipes with the new resin are tighter than those seen in installations with the old resin – this points to a deterioration in installation practices

The testing he carried out to support his theory was again an modified test

Iplex has carried out actual testing of this theory with experts in Spain – these show there is no material difference between the old and new resins

ENVIRONMENTAL STRESS CRACKING

- ➔ BGC alleges that the mode of failure of the Typlex pipes in WA is “Environmental Stress Cracking”. This does not fit the facts.
- ➔ Environmental Stress Cracking is a form of Slow Crack Growth. It requires three elements to be present: Slow Crack Growth that is Brittle in nature and that occurs at a Stress lower than the yield stress of the polymer; and an Environmental factor that attacks or degrades the polymer.
- ➔ Dr Scheirs has not identified an Environmental factor that attacks or degrades the Iplex polymer. Dr Scheirs and BGC agree that chlorine (a chemical) is not a factor in the Perth plumbing failures. BGC (not its expert) advances cooler water temperatures as an Environmental factor. This is not plausible. It assumes the WA water supply is colder than anywhere else in Australia. It is also not supported by the water sampling data Iplex has received from WaterCorp. Further, Dr. Scheirs has not explained why the hot water pipes have not failed when environmental degradation is typically worse in hot water compared to cold.
- ➔ Further, the data in Dr Scheirs' report points to Stress as the dominant factor causing the early failure of the pipes.
 - His data suggests that radial bends on Typlex pipes in WA are tighter than for LYB pipes, leading to larger bending stresses on Typlex pipes. This is an important point as it is consistent with Iplex's hypothesis that installation practices in Perth are deteriorating.
 - The location and direction of the cracks (on bends and in a radial direction) of themselves also point to tensile stress along the pipe axis as the predominant stress on the pipe.
- ➔ Consistent with its approach of testing each theory proposed as a potential cause, Iplex has engaged an independent laboratory in Spain to perform a 'crack round bar' testing to assess whether there is any difference between the two resins in terms of their resistance to Slow Crack Growth. Whilst there are still some results still to be calculated, the results received to date are in line with Iplex's internal view that there is no material difference between the resistance of LYB and Typlex to Slow Crack Growth.
- ➔ Additionally, the Environmental Stress Crack resistance testing carried out by Dr Scheirs was modified testing. It was not performed in full accordance with the reference ASTM Standards and cannot be relied upon for assessing either material's true Environmental Stress Crack resistance. In fact, Dr Scheirs' extreme modifications to the ASTM Standards may have induced a different failure mode.
- ➔ The results of Dr Scheirs' analysis do not, despite assertions to the contrary, support the statement that the Pro-fit pipe is more prone to Slow Crack Growth or Environmental Stress Cracking.



Why do we consider that BGC's expert report is not credible? (IV)

We and our leading global polymer experts consider the report from Dr Scheirs lacks credibility

- The comments on the prior three pages are based on the information and testing results available to Iplex at the current time.
- Iplex views are aligned with those expressed separately by its independent expert experts, Professor Graeme A. George AM, Professor Emeritus of Polymer Chemistry at the University of Technology Queensland and Principal Polymer Scientist at ALS Industrial Services Pty Ltd, and Dr Lucy Baker, Director and Materials Scientist for PATH, who are leaders in their respective fields.



Why have we not previously responded publicly to BGC's latest theory – or other theories that have been put to us? (I)

- ➔ As we have noted in our previous market releases, both DMIRS (Building & Energy) and BGC have said that they believe the pipe failures are due to an Iplex manufacturing defect. Their reasoning for this has changed over time.
- ➔ For example, one early theory proffered by both DMIRS (Building & Energy) and BGC was that the pipe lacked sufficient antioxidants. We responded to that and have proven, through testing and engagement, that not to be the case.
- ➔ DMIRS has engaged a consultant who, while not a polymer chemist, over the last few months has put forward to Iplex two different theories of why Iplex pipes are defective:
 - ➔ The first related to concerns about the extrusion and cooling process used during the manufacturing process. Iplex provided evidence to DMIRS about its extrusion and curing. Iplex also understands DMIRS (Building & Energy) is no longer pursuing this theory.
 - ➔ then DMIRS advised Iplex of another theory of defect, which was contained in a report from its consultant and described as a “probable” theory. It was based on experimental laboratory work and alleged that, under those experimental conditions, failures associated with isothermal cooling could be produced. Iplex responded to DMIRS (Building & Energy) and its consultant of the concerns it has with translating the experimental hypothesis to real world manufacturing and installations in WA along with the Iplex’s investigations showing that the temperature of drinking water in Perth in installed conditions is not capable of meet the experimental conditions nor abnormally different to other parts of Australia. The consultant also confirmed to Iplex that his theory does not apply to any pipe extruded and sold in straight lengths (as opposed to extruded onto jumbo coils). About 75% of pipe supplied into WA are of the type the consultant’s theory has no issue with.
 - ➔ Each of these theories is different to that currently put forward by BGC.



Why have we not previously responded publicly to BGC's latest theory – or other theories that have been put to us? (II)

- In June, BGC wrote to us with the theory presented at its briefing, and enclosed extracts of Dr Scheirs reports.
- On receipt, as it has done with all propositions, Iplex and its polymer experts immediately reviewed that theory and, for reasons described in previous slides, found it lacking in credibility, and was not a basis for Iplex to change its view about the quality of its product.
- It is appropriate market practice for allegations to be properly assessed before it is disclosed by us.
- We have nonetheless put each of the theories in the BGC and DMIRS allegations through testing and not yet found a reason to conclude that they are a basis for us to change our view about the quality of the Pro-Fit pipe.
- If any testing had found a theory to be credible, Iplex would have disclosed that to the market as it would have been new information. However, receipt of yet another theory which lacked credibility and has not been shown to be correct by testing does not change the position previously advised to the market.
- Finally, we note that what was provided to us in June by BGC came as a **legally privileged and with an invitation to negotiate** with BGC under threat of legal proceedings. While we indicated we were prepared to discuss matters with BGC, but BGC has not engaged in those discussions, nor has it issued legal proceedings.



A reminder of our prior disclosure on this matter, which remains true

→ Fletcher Building's disclosures about the risk of this matter in its Annual Report released on 16 August (see page 77 in particular) remain true:

“Ultimately, if Iplex Australia is found to bear some responsibility, the cost to it in rectifying homes with Pro-fit installed (as well as to meet any damages claims, fines and other costs) may be a sum that could have a material impact on the Group's financial position. However, the extent to which Iplex Australia is ultimately held to have any responsibility and the impact that may have on the Group is not able to be established at this time. Those matters will depend on resolution of a number of matters, including:

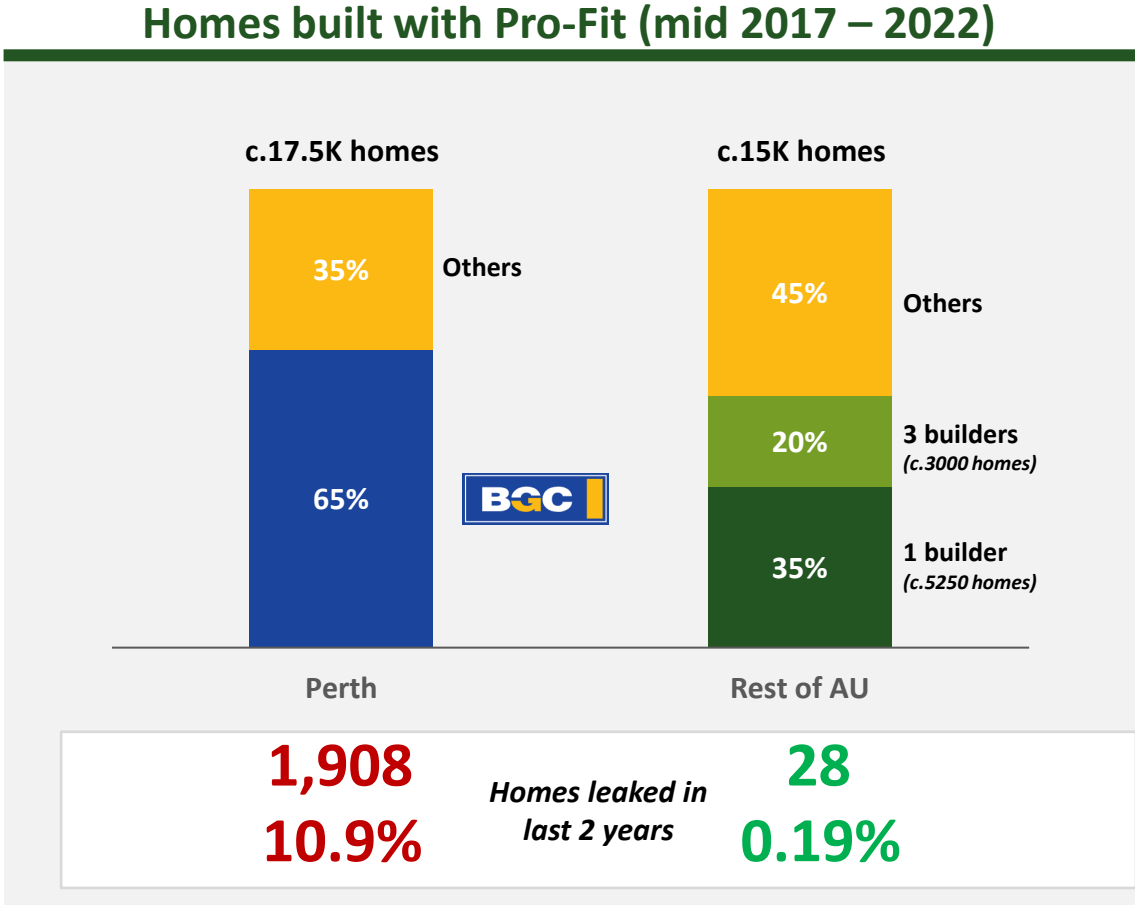
- the final determination as to cause(s) and the allocation of responsibility between Iplex Australia and other parties;*
- the type and scale of remediation required, including the cost of undertaking it;*
- other losses suffered by third parties ultimately attributable to Iplex Australia;*
- if and how any relevant insurance policies respond; and*
- the time frames over which payments may be required. For example, removing Pro-fit from houses in Western Australia may take a number of years to do, given the scale of that task and the constrained resources in the Western Australia market likely to be available to undertake that work. If Iplex Australia was to become subject to litigation in respect of this matter, final judgment may not be reached for some time.*

As these matters may continue to take some time to be identified and settled, Iplex Australia will continue to work with relevant stakeholders including homebuilders on an appropriate path forward.”



How might the industry respond to and resolve these issues?

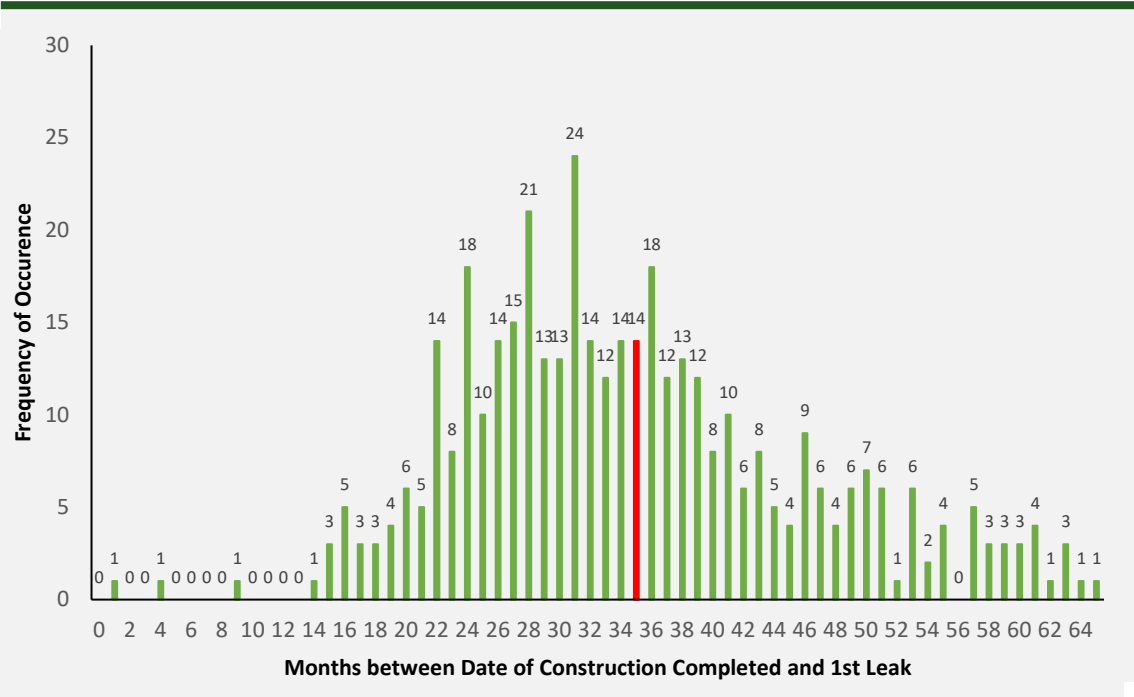
Remember: this is a Perth issue, not a national one



How might the industry respond to and resolve these issues?

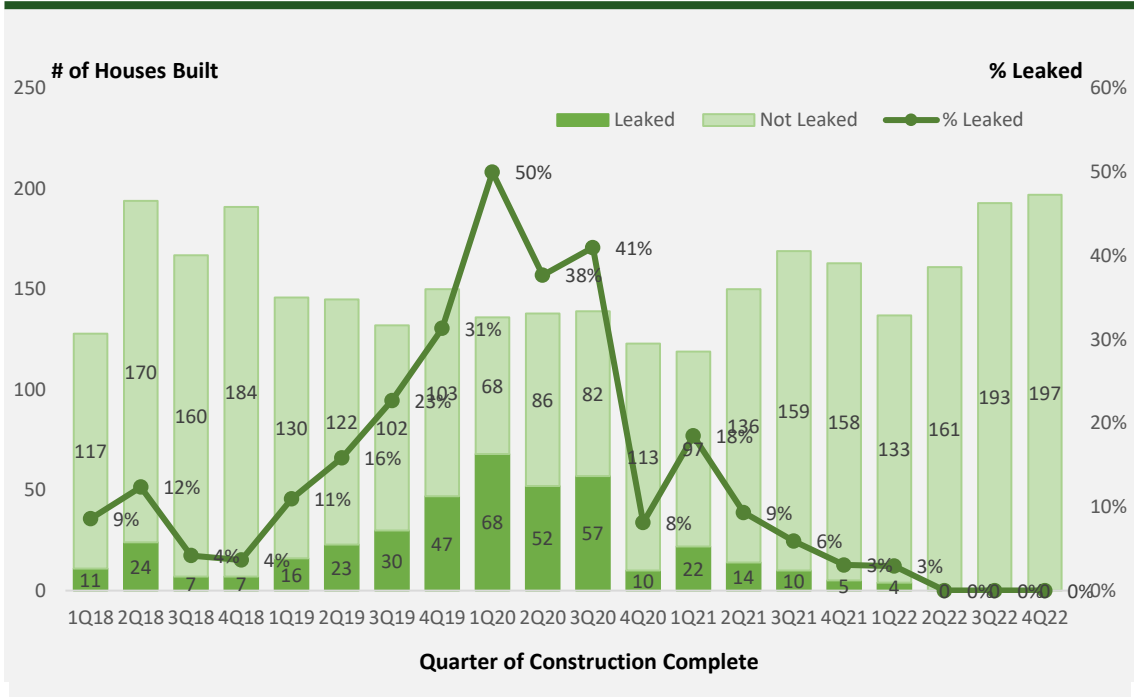
The evidence does not support the claim that all houses in Perth will be affected

Time from construction completed to 1st leak (in months)



- Graph shows the average period of time from house build date to a home's first leak is 35 months
- Houses are unlikely to leak after 5 years have past the construction date

Leak rate by house build period



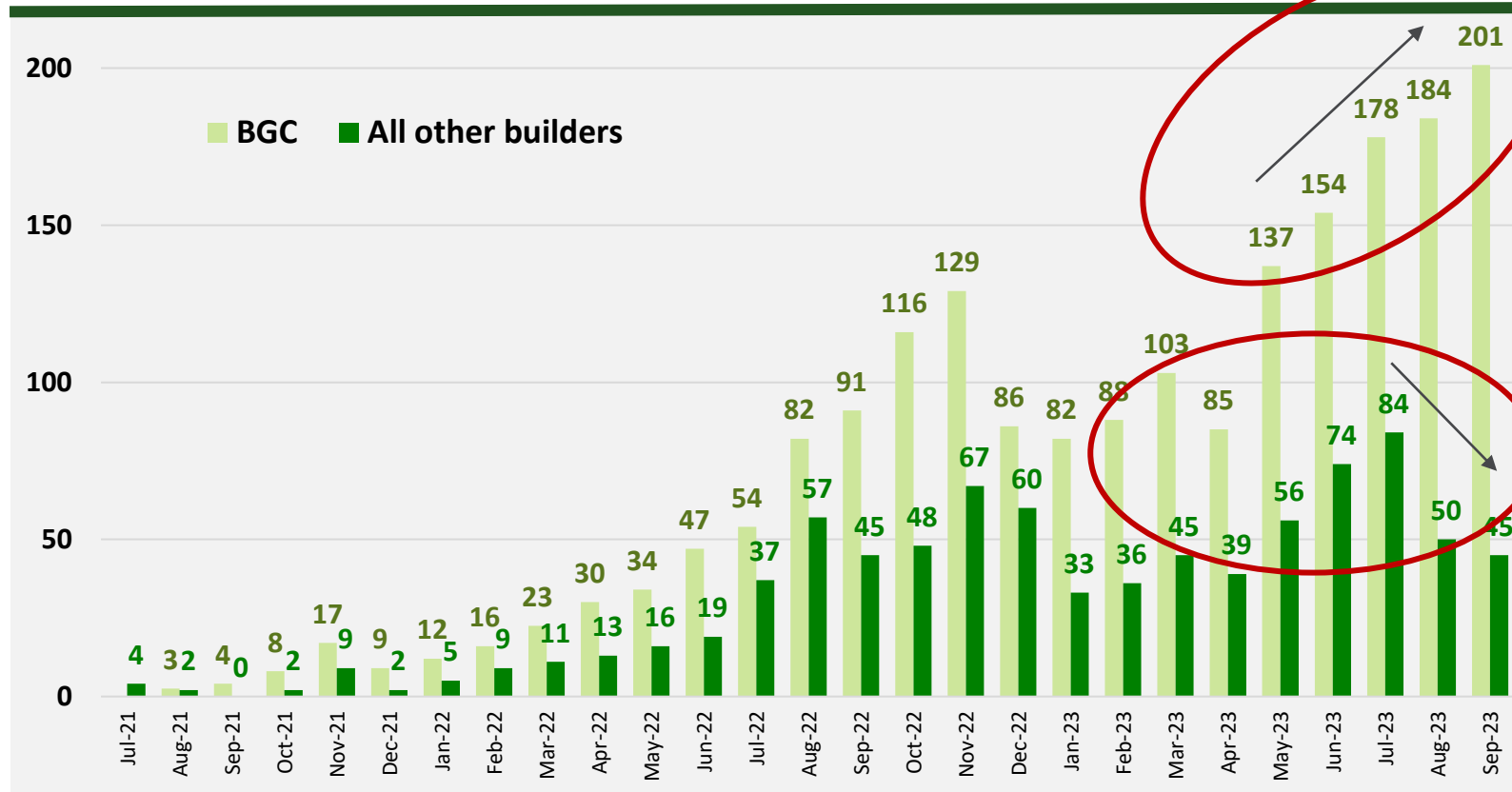
- Graph show which houses have leaked and not leaked by construction period
- House built between 4Q19 and 3Q20 have a much higher leak rate (financial years)
- Homes built prior to 4Q19 are leaking at a much lower rate and those that have not been affected have a low probability of leaking



How might the industry respond to and resolve these issues?

Failure rates in non-BGC homes outside appear to be on a different trajectory

Plumbing failures (Jul 21 – Sep 23)



- BGC claims the situation is getting worse and we are only seeing the tip of the iceberg
- We are seeing the opposite trend with other builders who we are working with
- We have been proactively funding the replacement of ceiling pipes for 5 months now with Delstrat. BGC was provided the same offer, but declined.
- The builders we are working with have seen a ~46% reduction in leaks since July



How might the industry respond to and resolve these issues?

There are multiple approaches that may be used to provide a solution

	1 CEILING PIPE REPLACEMENT	2 TOP PLATE PIPE REPLACEMENT	3 LEAK DETECTION	4 WALL PIPE MAPPING	5 NON-DESTRUCTIVE TILE REMOVAL	6 DATA ANALYTICS & TRENDS	7 PIPE RE-LINING (NEOFIT)	8 PIPE RE-LINING (REDLINE)
DESCRIPTION	Replacement of Pro-fit pipe located in the ceiling to prevent future plumbing failures in this space	To non-destructively extend the Ceiling Pipe Replacement down into the top of the wall chase	Installation of Leak Detection Unit at the property water meter	Detection of pipes within walls to minimise damage when breaking into chase or removing tiles	Non-destructive removal of tiles that are covering pipe chases	Using AI and Predictive data tools to identify houses likely to fail ahead of time	Permanently re-line pipework in walls utilising internal sleeve	Permanently re-line pipework in walls utilising an internal coating
BENEFIT TO HOMEOWNER	Reduced likelihood of plumbing failure. Reduce damage to property	Reduced damage to home during wall bend replacement	Reduced damaged to property	Faster wall pipe replacement. Less damage to property	Reduced damage to property when replacing wall pipes	Provides a fact base to determine the houses likely to require fixes	Reinstatement of pipe integrity. Full prevention of future plumbing failures	Reinstatement of pipe integrity. Full prevention of future plumbing failures
SUMMARY STATUS	Underway	Ready to Deploy	Trialling	Initial trials underway	Early development est. trials late Nov	Some trends emerging but larger data set critical	Initial trial complete, testing underway	Trials failed and solution not feasible

DEVELOPMENT TIMELINE

Ready to Deploy




How might the industry respond to and resolve these issues?

A product recall is not justified and would be needlessly disruptive to homeowners

The issue is **only occurring in Perth**, not nationally. Suggesting that it is a national issue is creating needless worry for many thousands of homeowners

In Perth, it is affecting a portion of homes – **those with poor installation**

Why replace pipes that have been installed properly and are not leaking? **Creating this disruption for homeowners is madness**

For affected homes, we are working on a **range of fix solutions** which are quicker, less costly, and less intrusive for homeowners

As BGC rightly point out, there is **no capacity in the industry to deal with a product recall**. Yet there is better capacity to implement the alternative fixes

In this context, a product recall...

- Is **not a sensible way** to fix to the issues in a timely way
- Would **create massive, needless disruption** to unaffected homeowners
- Is **totally impractical** given capacity in the industry



How might the industry respond to and resolve these issues?

BGC's estimated repair cost is sensationalist – scenarios that better align with the current evidence suggest that an industry cost to repair affected Perth houses could be a fraction of that, something in the order of \$50m to \$100m

Perth only issue



1

- ~17.5K homes where Pro-Fit is installed

Not all houses in Perth are affected

2

- Perth failure rate is ~11% for homes built between 2017-2022
- Peak leak rate is ~50% of homes built in 1Q20

Range of solutions available

3

- Full house re-piping is not needed or justified
- Our current cost of repairs are averaging ~\$4k
 - Simple leak repair is ~\$1k and a full ceiling pipe replacement is ~\$5k-\$6k
- Preventative leak detection unit is ~\$1k
- At scale, and depending on type of fix, assume costs to repair affected houses average ~\$10k per home



Scenario A

~\$50M

- # Perth homes = 17.5K
- Failure rate = ~25%
- Avge cost to fix = ~\$10k

Scenario B

~\$100M

- # Perth homes = 17.5K
 - Failure rate = ~50%
 - Avge cost to fix = ~\$10k
- These scenarios set out assumptions of industry costs to fix the failures over time, not the liability of Iplex or any other person
 - Given failures are progressive, these costs to the industry would likely to spread over several years



Where to from here?

1. Continue to support customers and homeowners with our Fund
2. Continue to collect evidence as to causation, including a period of joint inspections with DMIRS as discussed with them in September
3. Apply data science to the expanded database. With more data, the industry should be able to better predict the likely housing stock that has had poor quality installs and that are more likely to suffer from a future leak. Also, knowing which installation errors require fixing should limit the scope of the fix to those with quality issues as opposed to a full house re-pipe.
4. Continue to work on appropriate and proportionate fixes
5. Finalise remaining product testing and analyse reports
6. Engage with WA regulators on findings of the above



Summary

- Fletcher Building is committed to helping the industry get to the bottom of the plumbing failures that have arisen in Perth.
- We have been supporting customers and homeowners with our \$15m fund while causation, best fix methods and an industry solution are developed
- We dispute many aspects of BGC's presentation.
- There are no abnormal leak issues on the pipe installed on the East Coast of Australia. We are not aware of any issues from this resin in other geographies
- Evidence points to installation as the reason leaks are occurring in some houses in Perth, and that installation practices have deteriorated over time
- Our testing on the product is well advanced. Our tests to date continue to show that our Pro-fit product is code compliant and fit for purpose
- The evidence does not support the BGC extrapolation that all homes in Perth will be affected by these installation failures
- A product recall against this backdrop is not justified and would be an unnecessary impact on homeowners with perfectly good pipe and pipe installations. There are a number of less costly, less intrusive, and more rapid fix options for those homes that have been affected that will help
- BGC's estimated repair cost is sensationalist – scenarios that better align with the current evidence suggest that an industry cost to repair affected Perth houses could be a fraction of that, something in the order of \$50m to \$100m
- We will continue to work with the regulator and other stakeholders over the coming months to complete the fact base, agree the fix approach, and assist in developing an industry solution



Questions?



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