

A photograph of a woman and two young children. The woman is in the background, looking down at a child in the foreground who is holding a glass of water. Another child is visible on the right side of the frame, looking towards the camera. The scene is brightly lit, suggesting an indoor setting with natural light.

Asset Health Research – Full report

A WaterTalk research report prepared for United Utilities
April 2021

Background, approach and summary

Research background

United Utilities delivers 1.8 billion litres of water a day to more than 3 million homes and businesses in the North West, and is responsible for 78,000 kilometres of wastewater pipes which take sewage from 7.3 million people for treatment at nearly 600 wastewater treatment works. Combined with numerous renewable energy sites, vehicle fleets and other properties, this points to a significant asset base.

The effective maintenance of these assets is critical in being able to deliver a reliable and quality service to customers; at the same time, there are a number of different factors to consider in doing so, including maintenance costs and the degrees to which asset health is allowed to decline at the expense of investing in approaches to improve service. The current challenge is to ensure that the business can balance short term performance improvements for customers against the longer term health of the asset base.

Following previous research with the WaterTalk panel in 2018, the business wished to engage with customers to understand how they think United Utilities should be managing their assets. We chose to speak to customers about their own personal assets (e.g. a phone, car, roof and boiler) to help them think about approaches to maintenance and repair, before tackling more complex UU maintenance decisions.

Research objectives and approach

Quantitative and qualitative research was required in order to understand the following:

1. United Utilities' customers' approach to proactive and reactive maintenance with the associated balance of risk and cost
2. At what cost point attitudes to proactive maintenance start to change
3. Whether there is any consistent pattern to customer attitudes to maintaining different types of assets
4. Customers' reactions to the maintenance of assets, either as
 - a). 4 hypothetical scenarios for the qualitative research

OR

 - b). 6 hypothetical scenarios in the quantitative research

Qualitative:



Four x 90 minute online discussion groups with customers from the WaterTalk community

The groups took place between Wednesday 3rd and Monday 8th February 2021

Quantitative:



A 10-minute survey with 832 customers from the WaterTalk community (NB. See appendix for demographic breakdown)

Research took place between 18th – 25th March 2021.

Executive overview

Executive overview

1

While customers by no means fully understand the extent or scope of how UU manages its asset base, and the mechanics of service provision aren't front of mind for them, when asked to consider the issues they do appear to care about them (as is also the case when confronted with service disruption). Only one in four actively 'does not care' how you manage your assets

2

When customers think about their own assets, it does highlight a number of considerations in terms of how they go about maintaining them and how they think about proactive vs reactive actions. Family vehicles and mobile phones tend to be more front of mind; in keeping with the qualitative findings, statistics show that roofs and boilers are less actively considered on a regular basis. At the same time, roofs and boilers would have the greatest impact in the event of a problem, and so customers are more willing to spend big and replace them if need be

3

On presenting a number of UU asset health scenarios, customers go beyond learnings about their own assets, and point to a number of important considerations they expect UU to take into account when deciding on a course of action. Some of these considerations relate to immediate impact on services and some relate to future service needs scenarios – these are often well thought through. Overall, the majority are in favour of proactive maintenance, and are accepting that an increase in bills is required for this

4

Customers are most prepared for larger spending on assets that are perceived to be 'directly' impacting their water supply, such as water mains, sewage works, and wastewater treatment facilities. In particular customers find water mains to be the leading priority where spending is most easily justifiable. Bioresources and IT infrastructure are less of a priority as it may not be perceived to impact them, even though these will have a critical role to play in delivering services and keeping costs down

5

Having taken all of this into account, customers are willing to support good proactive maintenance practice and service delivery through their bills. Customers are most prepared to pay an extra £2 p/a on their bills, with support steady up to £6 p/a– yet bill increases above this limit are more polarising. Only one in four feel that UU should prioritise keeping bills as low as possible

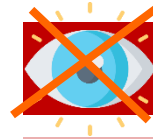
Maintaining and replacing personal assets

Attitudes towards customers' personal assets depend on whether that asset is front or back of mind



Visible assets

- Some personal assets are **more visible** as customers have **more touchpoints** with them (e.g. a phone or car) and use them daily
- The more front of mind the asset is, the **more customers care about maintaining them**
- Front-of-mind assets are also more likely to be linked to hobbies/interests (e.g. interest in tech or cars) and are less functional



Hidden assets

- Other assets are **less visible** and are not front and centre in customers' lives
- Customers have **fewer touch points** with these assets and are **less likely to notice issues** or think about proactively maintaining them
- They play a more functional role in customers' everyday lives



However, what is visible or hidden is **not always black and white** and **depends on life stage and life circumstances**. For example, those who are younger and more tech savvy may have more touch points with a mobile phone than those who only use it to make the odd call.

Even **within assets, certain aspects are more visible/hidden** (e.g. cosmetic damage to car that you can see vs. something wrong with the internal mechanics you might not be aware of)

Customers' age and income also influence their attitudes towards their own asset maintenance



Life stage

- There are some differences between age groups in the considerations people take into account when making a decision on maintaining their assets
- Younger customers may have less experience of household assets going wrong (especially a boiler or a roof) as they haven't lived in their houses for as long
- As such, they may be less likely to have had to confront 'hidden' assets that aren't front of mind (e.g. a boiler and a roof) and therefore may factor them less into their future planning (although in hearing stories from others they may change their mind).



Household income

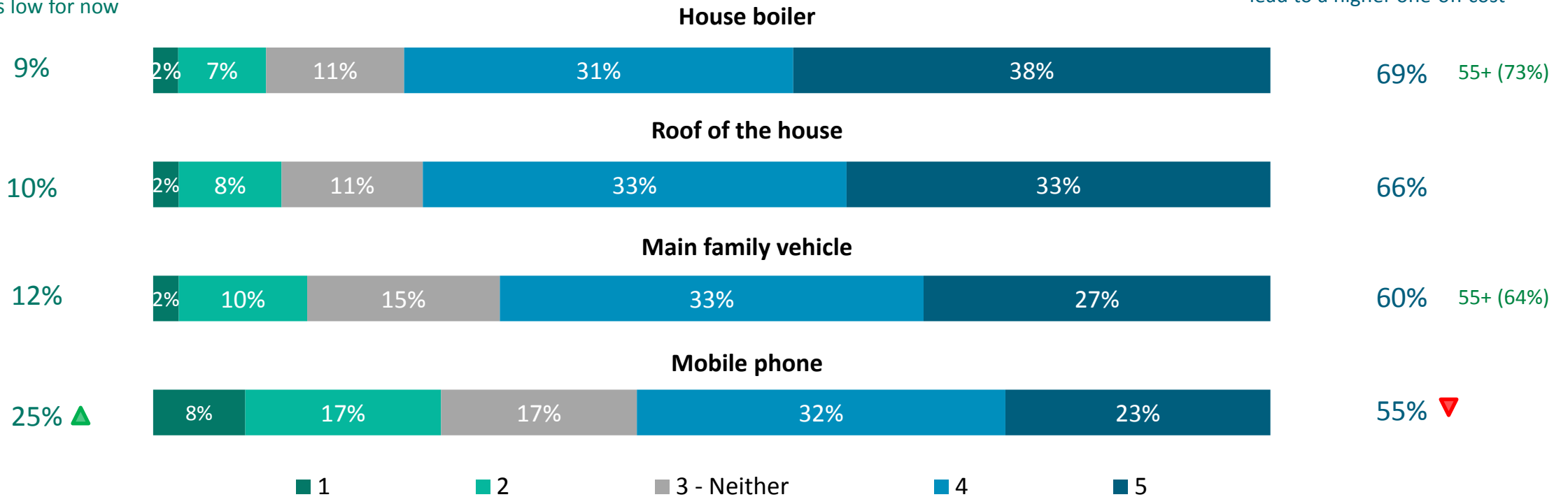
- While everyone we spoke to understood the importance of proactive maintenance, those with a lower income are less likely to upgrade an asset for better features if the base functionality of the asset is adequate
- E.g. someone with a higher income may want to invest in a combi boiler now for improved functionality and to save money later down the line
- Conversely, for someone with a lower income, if the boiler functions perfectly well then they would rather wait until it breaks to replace it to utilise it to its full lifespan
- Planning and budgeting for repairs and maintenance appears to be common for the lower income groups

‘Bigger’, but less front of mind assets are more likely to be replaced when problems occur; this reflects the finding that customers tend to sweat these larger assets.

Spend the least possible now, accept it might not be as reliable as a new asset, to help to keep costs low for now

Older customers are more likely to consider replacement of boilers and vehicles to prevent any issues (and may be more likely to have experienced issues in the past)

Replace it when it becomes unreliable, even if this might lead to a higher one-off cost



▲ ▼ Triangle: Significant difference at 95% conf. level.

There are a number of consideration factors customers think about in relation to managing their personal assets

Short term cost implications

Can I afford to replace this asset now? How will this impact me short term?

Long term cost implications

If I invest in this asset now, how will that benefit me further down the line?

Disruption to daily life

What will be the frequency/length of disruptions to my daily life? What if nothing is done?

Emotional impact

How will this affect me and my household emotionally? Will it be more stressful if I don't act now?

Improved functionality

What better features and improved functionality are available? Are they worth it?

Health and safety

Is safety being compromised if I don't act? Who will be impacted?

What do we learn from customers when talking about their own approach to maintenance of assets?

- While not all customers give much regular thought to the 'background' or 'root and branch' assets such as roofs and boilers (until they fail), there are some important learnings
- While these assets might be hidden from sight for much of the time, the impact of failure is potentially huge
- Experiencing one of these failures (e.g. damage through water ingress to a roof or several days without hot water for a young family), brings the need for proactive maintenance into sharp relief
- This can mean spending a lot of money to ensure an asset is fit for purpose, as well as regular checks and maintenance
- Less fundamental (and cheaper) assets such as phones and vehicles are still important; at the same time many can bear to keep these assets 'ticking over' as long as they do the job to a functional degree

The boiler just got replaced 2 years ago because the old one, god knows how old it was. I couldn't even find anyone to service it anymore, there were no parts for it, so I ended up having to replace it. And I'm glad I did, because you need it in this country particularly in the bitter winters.

Female, 18-34, Higher Income

Yes, I mean, we've had an assessment on it so we know it's alright for now, and somebody comes out every year, quite helpfully, one of the roofers, and just says, 'It's still alright, you'll get through another winter'. We're a bit like that, we're a bit, I wouldn't say overcautious, but we're cautious.

Male, 35+, Higher Income

Understanding how United Utilities should manage and maintain their assets

The scenarios as discussed with customers in the qualitative research



Example 1: Wastewater Treatment Works

A simple **wastewater treatment works** was built in 1950. It serves a **small village of about 500 properties**, which has expanded from about 250 properties in the fifties.

Since the water industry was privatised in the late 1980s **the works has been expanded with improved treatment**. The stream that receives the treated sewage is now much healthier and supports more wildlife than at any time since the industrial revolution.

The **original assets** from the 1950s are **past their useful lives** and regular failures mean that they are no longer able to fully treat the sewage during heavy rain; the works is starting to fail with treated samples sometimes not meeting standards. **There is no modern technology on the site and performance is managed by regular visits by an operator.**

Things to consider

- Without modern technology, failures may only be noticed after they have damaged the stream
- Manning sites is expensive with lots of unproductive time spent travelling between small sites
- Old assets will only get more unreliable, and eventually will be a health and safety risk to staff and the public
- Pumping sewage is expensive, but is often cheaper than locally treating it
- Cheap solutions usually need frequent additional spend in the future

Options

Relative Cost

- | | | |
|---|--|------|
| 1 | Rebuild the works | ££££ |
| 2 | Build a pumping station, shut the works and transfer the sewage through a new pipe to another site a mile away | ££ |
| 3 | Build a reedbed alongside the works on some land UU already owns to provide extra "natural" treatment | ££ |
| 4 | Replace the failing mechanical assets, but keep using the old concrete tanks and channels | ££ |



Example 3: 1930's Sewers

A **suburban area of 1930s semi-detached houses** has had a few issues with **sewer collapses** causing nasty sewage spills into the road and some front gardens over the last few years.

The **collapsed sewers have been repaired** but **camera surveys** show that quite a few of the **other sewers in the area are also in poor condition.**

During heavy rainfall it is quite normal to see water spilling out of manholes and the local sewer overflow often spills into a stream on rainy days.

Things to consider

- Laying new rainwater systems is expensive in a built up area
- 1930s sewers are approaching 100 years old. They have served well, but they are starting to fail.
- Heavy rain squeezes sewers, causing them to fail faster
- Spills of sewage into streams can damage wildlife.

Options

Relative Cost

- | | | |
|---|---|------|
| 1 | Relay all of the sewers with separate rainwater and sewage systems | ££££ |
| 2 | Lay a new rainwater system but keep the old sewers for sewage | £££ |
| 3 | Survey and replace the parts of the sewers in the worst condition. | ££ |
| 4 | Install monitors to warn United Utilities of problems so that they can respond quickly. | ££ |



Example 2: Local Water Mains

A **busy urban area** has **water supply pipes** laid in the 1930s.

The **publicly owned pipes** are made of cast iron and are now **90 years old.**

There have been **increasing instances of discoloured water** in some of the houses over the last few years and it is becoming a regular sight to see a van, barriers and a hole in the road as a burst pipe is repaired.

However, **water supplies interruptions are rare and relatively short**, due to the fast response of the gangs and the availability of "water on wheels" supply tankers. Many of the local properties still have lead pipes; these are owned by the homeowners.

Due to the increasing water quality contacts and the number of repairs being carried out the area has now been identified as a priority for investigation.

Things to consider

- There is a trade-off between regular minor disruptions and a single major programme of road closures.
- The different options will need repeating at different times
- Replacing pipes is likely to cost twice as much as relining the pipes
- Reducing water pressure will mean showers are less powerful and baths and sinks will take longer to fill.

Options

Relative Cost

- | | | |
|---|---|-------|
| 1 | Replace all of the pipes in the area, the new pipes should last at least 60-80 years. There would be a rolling programme of partial road closures and traffic lights for 6 months. | £££££ |
| 2 | Reline all of the pipes in the area, linings should last up to 20 years, but there is little local experience of using them. There would be a rolling programme of partial road closures and traffic lights for 6 months. | ££££ |
| 3 | Clean the pipes to remove rust and dirt, reduce the water pressure and install monitors to predict leaks before they are noticed by customers. | £ |



Example 4: Borehole Water Treatment Works

A **small water treatment works** gets its water from **3 deep wells (boreholes)** before treating it, for use in the local area.

The boreholes were drilled **50 years ago.**

The **assets on the site are approaching the end of their useful life** and the pumps are **starting to become unreliable.**

The **electrical panels and switchgear are old** and don't meet the latest standards.

Also **the water is quite hard** and leads to scale build up in showers, kettles and pipes.

Things to consider

- Demand for water can increase by up to 50% during really hot days, spare capacity is really important
- Water from underground is more reliable than water in reservoirs, even in hot summers
- Small sites are relatively expensive to run
- Sometimes people don't like borehole water due to taste and the potential for scaling over time

Options

Relative Cost

- | | | |
|---|--|-------|
| 1 | Upgrade the site to modern standards | £££££ |
| 2 | Replace the pumps and electrical equipment. Send the water for treatment at a bigger works | ££ |
| 3 | Mothball the site with limited maintenance, knowing that if it is needed in a drought it is likely to need a lot of investment | £ |
| 4 | Abandon the site | £ |

The scenarios were rotated across the 4 groups, with each group seeing 2-3 scenarios.

The scenarios tested with customers in the quantitative research.

Wastewater Treatment Works

A wastewater treatment works receives sewage, rainwater and wastewater from homes and businesses. This is then treated to make it safe, the solids are removed and the cleaned up water is discharged back into the environment.

Borehole water treatment works

Boreholes are deep wells in the ground from which water companies extract groundwater. This water is then treated to make it suitable for drinking. They are part of a mix of water sources including reservoirs and rivers, used to supply water to homes and businesses. They are often used during times of high demand, such as during hot, dry summers.

Local water mains

Water mains are the underground pipes that supply drinking water to homes and businesses in an area. They are made of different materials, depending upon when they were laid, often older houses are served by older pipes, although many have been replaced since the late 1980s.

IT infrastructure

IT infrastructure includes all of the hardware and software needed to run a modern utility company. From computers to help operate treatment works to billing systems and all of the other modern high tech equipment, silently operating behind the scenes.

Suburban sewers

Sewers are underground pipes that carry away wastewater, sewage and other things that homes and businesses put down their drains. They all eventually lead to your local wastewater treatment works.

Bioresource treatment facilities

Bioresource treatment centres treat and dispose of sewage sludge. They process the sludge to create natural gas, generate renewable electricity, and fertiliser for crops; helping to return the nutrients from our food back into the environment in a safe and sustainable way.

United Utilities' assets are not front of mind for customers but they are happy to support good maintenance and pay to minimise disruption



UU Assets are Hidden

- UU assets are **not front of mind** and do not play a conscious role in customers' lives
- Customers have **very little contact** with these assets and are **less likely to** think about proactively maintaining them
- They play a more functional role in customers' everyday lives and they expect them to keep working

The first bit with the pipes, I can't fathom that much water or that much pipework. Those numbers just mean nothing to me. I can't imagine it.

Female, 18-34 Higher Income

But they are still important

- Like with personal assets, UU assets can become front of mind when issues arise; burst pipes, leaking sewage etc.
- This doesn't mean that customers don't care about it. In reality, keeping these assets running is seen as very important to avoid being impacted by issues, and in environmental sustainability

So, from an environmental point of view, it's incredibly important to fix that because that's water that can't be used and is just wasted and it's not just about the money that's wasted.

Female, 18-34, Higher Income

And customers are willing to pay for it

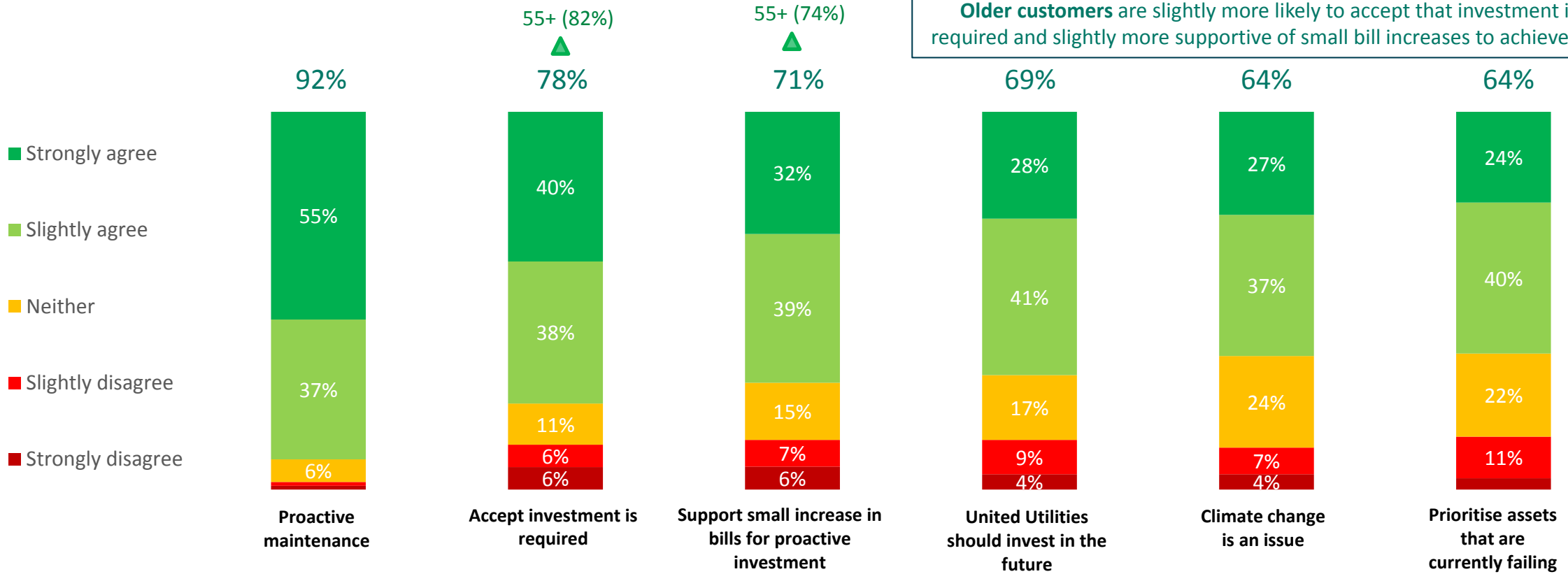
- Customers understand the money has to come from somewhere – some have already experienced increases. They are happy to support good maintenance and pay to minimise service disruption
- It is important however to be transparent with customers about where their money is being used, as well as how much UU is contributing and where

£10 That sort of figure, nobody's going to really get upset about, because they're not going to miss it.

Female, 18-34, lower Income

The majority actively expect United Utilities to invest in the network to prevent problems occurring, with an acceptance that support through bills will be required to do this

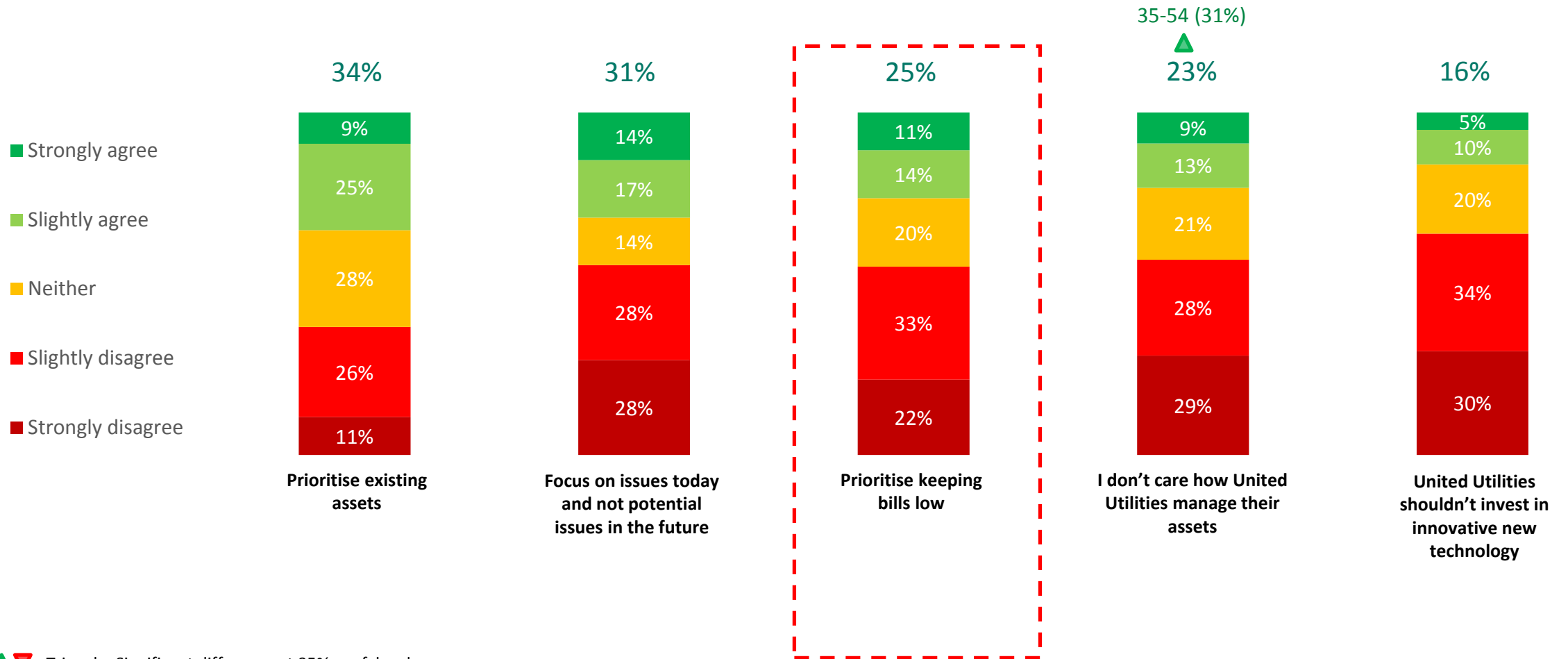
Older customers are slightly more likely to accept that investment is required and slightly more supportive of small bill increases to achieve this



▲ ▼ Triangle: Significant difference at 95% conf. level.



Only one in four customers believe that United Utilities should prioritise keeping bills low over proactive maintenance of their assets, or ‘do not care’ how the business manages its assets



▲ ▼ Triangle: Significant difference at 95% conf. level.

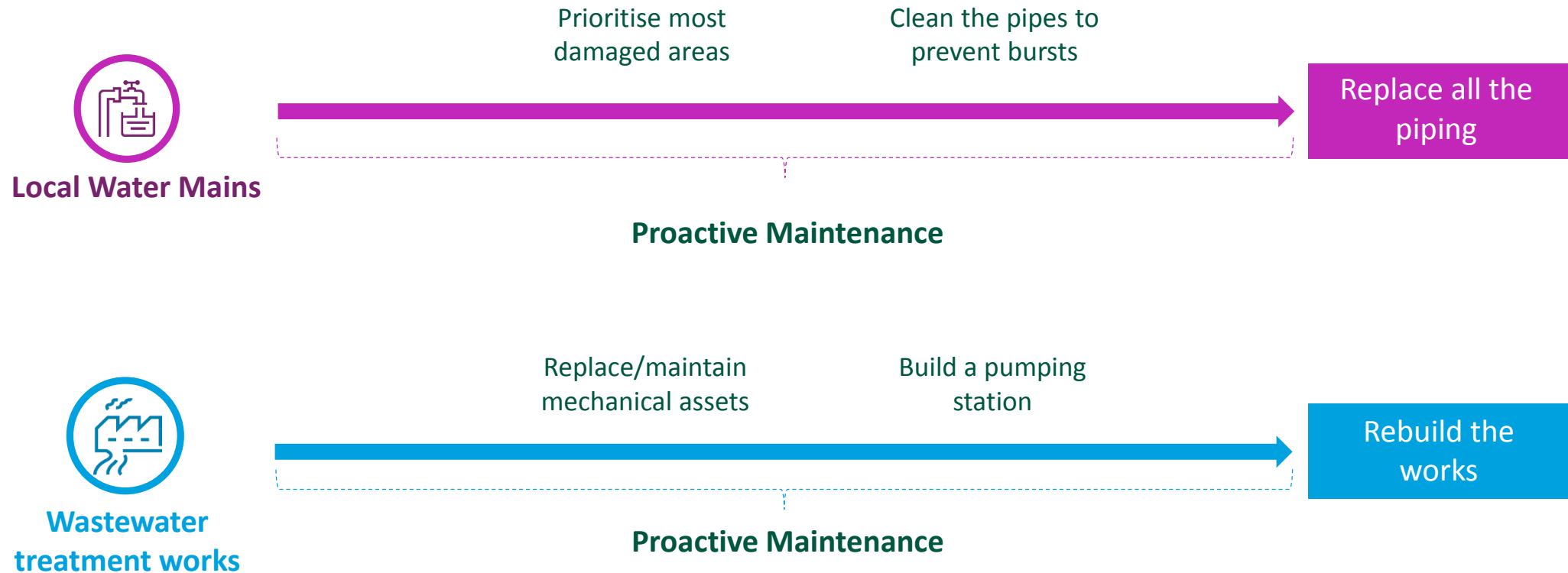
Q8. To what extent do you agree or disagree with the following statements? **Base:** All respondents (n = 832)

There are a number of consideration factors customers think about in relation to the different scenarios

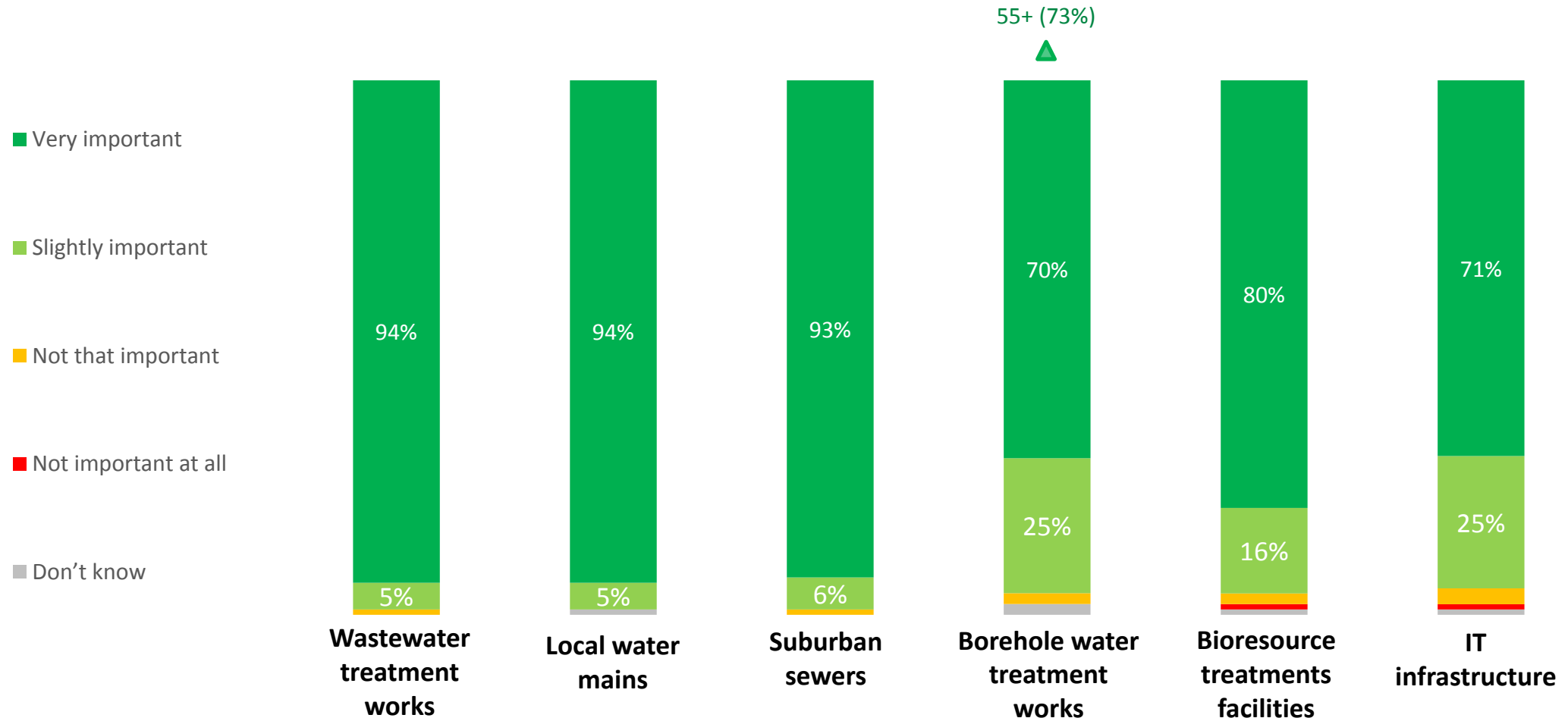
Future population density	If an area keeps growing, what impact will this have on the need for future maintenance?
Impact on the customer	How are customers impacted? How many people will be impacted by each option? What about inaction?
Immediate vs long term impact	What will be the frequency/length of disruptions? What if nothing is done?
Changes to area and landscape	How will this change the area? What are the environmental implications?
Public health and safety	What impact will each option have on public health and safety? What if nothing is done?
Future network requirements	How much work will need to be completed in the future if this option is selected?
Prioritisation of other work	There's an understanding that these scenarios don't exist in isolation... what other work may need to be prioritised?

Shorter term proactive maintenance should be undertaken with an eye on potential future upgrades

On balance, when the time is right, most people would like to see UU build or replace something that is resilient and fit for purpose. However, that shouldn't stop cost effective proactive maintenance along the way. In some cases, it's acceptable to leave something not fit for purpose to go out of commission if a better option arises.



Maintenance of all assets are important, but most notably wastewater treatment works, water mains, and suburban sewers – those that apparently impact on day to day service delivery.



▲ ▼ Triangle: Significant difference at 95% conf. level.



Short term maintenance needs to be used in accordance with a plan for a long term solution

Key Considerations

Future population density

Immediate vs long term impact

Future network requirements

In summary

- A pumping station or replacing failing assets would be a good interim solution while planning to replace the entire works
- A minority felt that replacing the works would be too expensive; wastewater should be sent to the nearby works

Reasoning in decision making

- The population in the area is going to continue to grow, putting more and more pressure on the systems
- There needs to be a combination approach; you can't just shut down and rebuild the works, there'd need to be a solution for the current wastewater treatment
- Building a pumping station will be a good short-term solution, but soon that will put pressure on the other treatment works, leaving UU in the same predicament



Example 1: Wastewater Treatment Works

A simple wastewater treatment works was built in 1950. It serves a small village of about 500 properties, which has expanded from about 250 properties in the fifties.

Since the water industry was privatised in the late 1980s the works has been expanded with improved treatment. The stream that receives the treated sewage is now much healthier and supports more wildlife than at any time since the industrial revolution.

The original assets from the 1950s are past their useful lives and regular failures mean that they are no longer able to fully treat the sewage during heavy rain; the works is starting to fail with treated samples sometimes not meeting standards. There is no modern technology on the site and performance is managed by regular visits by an operator.

Things to consider

- Without modern technology, failures may only be noticed after they have damaged the stream
- Manning sites is expensive with lots of unproductive time spent travelling between small sites
- Old assets will only get more unreliable, and eventually will be a health and safety risk to staff and the public
- Pumping sewage is expensive, but is often cheaper than locally treating it
- Cheap solutions usually need frequent additional spend in the future

Options

Relative Cost

Options	Relative Cost
1 Rebuild the works	££££
2 Build a pumping station, shut the works and transfer the sewage through a new pipe to another site a mile away	££
3 Build a reedbed alongside the works on some land UU already owns to provide extra "natural" treatment	££
4 Replace the failing mechanical assets, but keep using the old concrete tanks and channels	££

If you start pumping through the other station, the other station it's being pumped to is going to hit its limits fairly soon. At some point, you're going to have to build a completely new works to cope with expanded properties in the first area, in the first place, plus you're going to have to start taking the overflow from the one that's being pumped to when it hits its limits.

Male, 35+, Lower Income

This is an area where the amount of properties has been growing over the years, probably that's going to carry on because, you know, the demand for housing isn't dying off.

Male, 35+, Lower Income

Long term planning for maintenance and repair is key to tackle high priority issues while there is the luxury of choice

Key Considerations



Example 2: Local Water Mains

A busy urban area has water supply pipes laid in the 1930s. The publicly owned pipes are made of cast iron and are now 90 years old.

There have been increasing instances of discoloured water in some of the houses over the last few years and it is becoming a regular sight to see a van, barriers and a hole in the road as a burst pipe is repaired.

However, water supplies interruptions are rare and relatively short, due to the fast response of the gangs and the availability of "water on wheels" supply tankers. Many of the local properties still have lead pipes; these are owned by the homeowners.

Due to the increasing water quality contacts and the number of repairs being carried out the area has now been identified as a priority for investigation.

Things to consider

- There is a trade-off between regular minor disruptions and a single major programme of road closures.
- The different options will need repeating at different times
- Replacing pipes is likely to cost twice as much as relining the pipes
- Reducing water pressure will mean showers are less powerful and baths and sinks will take longer to fill.

Options

	Relative Cost
1 Replace all of the pipes in the area, the new pipes should last at least 60-80 years. There would be a rolling programme of partial road closures and traffic lights for 6 months.	££££
2 Reline all of the pipes in the area, linings should last up to 20 years, but there is little local experience of using them. There would be a rolling programme of partial road closures and traffic lights for 6 months.	£££
3 Clean the pipes to remove rust and dirt, reduce the water pressure and install monitors to predict leaks before they are noticed by customers.	£

Immediate vs long term impact

Changes to area and landscape

Prioritisation of other work

In summary

- While potentially not an immediate possibility, the problem should be approached with the end goal of complete replacement, with short term fixes to allow for time to do so
- Some customers felt that relining may be an effective approach; this could be an option depending on how cost stacked up against full replacement

Reasoning in decision making

- **Replacing** the entire set of pipes would take the same amount of time as **relining** the pipes, however would need to be done less frequently. **Replacing** the pipes would save money in the long run, and be less of an inconvenience for customers
- Leaky pipes are **bad for the environment**
- UU will need to **prioritise** other work and the worst affected areas. Replacing all pipes all at once may not be possible
- Burst pipes are a **huge inconvenience**, however having water pressure dropped is not a solution

I'm sure we all know what road closures and temporary lights are like. I'd rather have that in 1 block than have it be every few weeks there's another leak. Because that's the problem that I've got near where I live at the moment.

Female, 18-34, Higher Income

I know option 2 would only last 20 years, but option 1, if you compared option 1 and 2, the benefits could last for 3 or 4 times longer. So, I'm thinking option 1 sounds better.

Male, 18-34, Higher Income

Yes, I think it's important to do it while you've got a choice rather than you get a few years down the line you literally have no choice, you have to replace them all and you have to find the money to do that.

Female, 18-34, Higher Income

Having the treatment works maintained in working condition will free up resource for higher priority jobs

Key Considerations

Impact on the customer

Future network requirements

Prioritisation of other work



Example 4: Borehole Water Treatment Works

A small water treatment works gets its water from 3 deep wells (boreholes) before treating it, for use in the local area.

The boreholes were drilled 50 years ago.

The assets on the site are approaching the end of their useful life and the pumps are starting to become unreliable.

The electrical panels and switchgear are old and don't meet the latest standards.

Also the water is quite hard and leads to scale build up in showers, kettles and pipes.

Things to consider

- Demand for water can increase by up to 50% during really hot days, spare capacity is really important
- Water from underground is more reliable than water in reservoirs, even in hot summers
- Small sites are relatively expensive to run
- Sometimes people don't like borehole water due to taste and the potential for scaling over time

Options

	Relative Cost
1 Upgrade the site to modern standards	££££
2 Replace the pumps and electrical equipment. Send the water for treatment at a bigger works	££
3 Mothball the site with limited maintenance, knowing that if it is needed in a drought it is likely to need a lot of investment	£
4 Abandon the site	£

I think it's important to keep the site but it sounds like it's probably not worth going all the way on this one. Just keep it serviceable but if we can send the water for treatment at a bigger works.
Female, 18-34, Higher Income

We are going to get increasingly hot Summers as the years go on with climate change. It does say there we do need the spare capacity, and I think if they just abandon it then potentially in 5 years time they might regret that, and then it'll cost more then to restart the site up from scratch or fix everything.
Male, 18-34, Higher Income

In summary

- In order to save resource and pay for other higher priority work, but also keep a back up water supply, proactive maintenance outweighs an expensive full upgrade.

Reasoning in decision making

- There is little direct impact on the customer (at least immediately), and there are no health or major environmental concerns that require a full upgrade
- It's important to keep the spare capacity, however upgrading the entire works would be expensive and provide little benefit. **Replacing the pumps would be a cost-effective way to keep the back up**
- Mothballing the site would be too big of a risk in case it was needed and would end up costing huge amounts anyway

With the potential to be a major health issue, sewers would be a top priority for complete replacement

Key Considerations

Impact on the customer

Immediate vs long term impact

Public health and safety



Example 3: 1930's Sewers

A suburban area of 1930s semi-detached houses has had a few issues with sewer collapses causing nasty sewage spills into the road and some front gardens over the last few years.

The collapsed sewers have been repaired but camera surveys show that quite a few of the other sewers in the area are also in poor condition.

During heavy rainfall it is quite normal to see water spilling out of manholes and the local sewer overflow often spills into a stream on rainy days.

Things to consider

- Laying new rainwater systems is expensive in a built up area
- 1930s sewers are approaching 100 years old. They have served well, but they are starting to fail.
- Heavy rain squeezes sewers, causing them to fail faster
- Spills of sewage into streams can damage wildlife.

Options

	Relative Cost
1 Relay all of the sewers with separate rainwater and sewage systems	££££
2 Lay a new rainwater system but keep the old sewers for sewage	£££
3 Survey and replace the parts of the sewers in the worst condition.	££
4 Install monitors to warn United Utilities of problems so that they can respond quickly.	££

You can put PVC pipe down the old sewer and that will stop all leakages. It reduces the capacity of the sewer. It's a cheaper way to do it.

Also, you've got to remember, what we're talking about here, if you go for the Rolls-Royce, you're paying for it.
Male, 35+, Higher Income

Sewage can be dangerous to health as well. If that spilled up into someone's front garden and there's little children, you don't know what's in that sewage, it could make people really ill, especially kids who like to roll around and don't wash their hands.

Male, 18-34, Higher Income

In summary

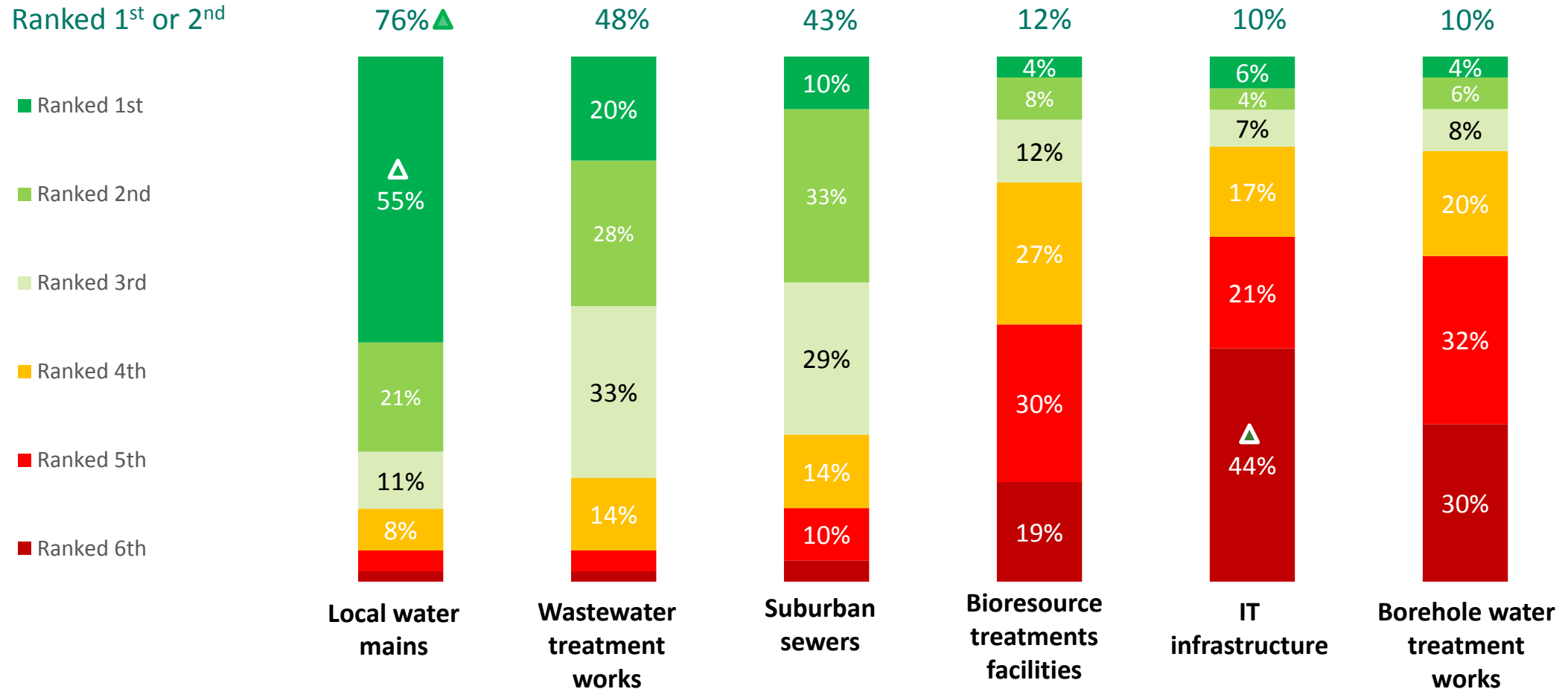
- Nearly all customers identified that the impact on health and the environment could be 'catastrophic', and so a complete rebuild was opted for. And the cost of compensation and fixing the issues could be very high
- One customer opted for replacing the rainwater system only, due to the cost of full replacement. They felt relining the sewers could be adequate

Reasoning in decision making

- There is an obvious health risk in having sewerage spilling out into people's gardens
- With climate change, weather will start to get increasingly wild, anything short of a complete replacement will be delaying the inevitable
- Not only will it pose a health risk, but UU may make themselves liable for any health complications
- Sewerage spilling out will damage and kill wildlife
- There are likely technology advancements that will vastly improve the operation of a newly installed sewage system – which is worth the upgrade

Which United Utilities assets should be prioritised?

Local water mains were seen to be the asset that United Utilities should prioritise – Borehole water works and IT infrastructure are not seen as key priorities.

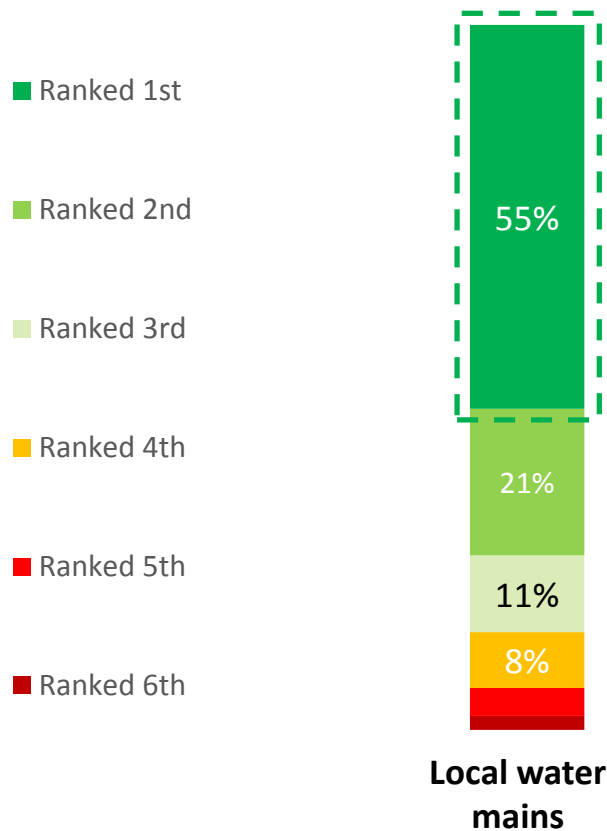


▲ ▼ Triangle: Significant difference at 95% conf. level.

Q5. Still thinking about this range of assets we'd like you to rank them in priority order, starting with the one you think should be maintained as the highest priority (1) and ending with the one you think should be given least priority (6). **Base:** All respondents (n = 832)



Customers associate poor maintenance of local water mains as something that could potentially lead to unhealthy and unsafe water if not properly maintained



Why did 55% of customer state that local water mains should be maintained as the highest priority?

- Key to having clean and good tasting drinking water in the home - with this having the biggest impact of customers' health
- Failure to keep this constantly maintained could lead to having the greater impact on customers' day to day lives - potentially leading to households not having healthy drinking water

"We all rely on/expect an uninterrupted supply of safe drinking water. While the other services are important and in some ways interdependent this has to be the number one"

Male / 55+

They are the primary source for getting drinking water to family homes. They can also be a major source of water loss (leaks)"

Male / 55+

"It would cause the most disruption to the customer and water is essential for everyday life"

Female / 35-54

"There is a high dependency on water for public and commercial use; without maintenance there is a risk of serious health issues"

Female / 55+

▲ ▼ Triangle: Significant difference at 95% conf. level.



Respondents in the quantitative research were then shown the following six hypothetical scenarios, diving into similar detail with the qualitative research.

Wastewater Treatment Works

A **wastewater treatment works** is currently serving more households than it was originally built to serve. It has been **expanded and upgraded**, and the **stream** that receives the treated wastewater is **healthier** than it has ever been. But the asset is now getting **old, does not have modern technology** and is no longer able to fully treat sewage during heavy rain, meaning **treatment is not always meeting the required standards**.

Borehole water treatment works

A **small water treatment works** gets its water from **3 deep wells (boreholes)** before treatment and use in the local area - the boreholes were drilled **50 years ago**. The water from this site is used as **'spare' capacity for the network**, and is only needed **when there is very dry weather**. The **assets on the site are approaching the end of their useful life** and the pumps are **starting to become unreliable**. The **electrical panels and switchgear are old** and don't meet the latest standards. Also, the **water is quite hard** and leads to scale build up in showers, kettles and pipes.

Local water mains

Old, iron, **water supply pipes** in a busy urban area are **now 90 years old**. It is now becoming more common to see **pipes burst** and for households to receive **discoloured water**. However, long **Supply interruptions are rare**, due to a rapid responses to failures, including standby water tankers and live repairs to pipes, without cutting off supplies. As the pipes are underground, the extent of any issues **cannot easily be identified**.

IT infrastructure

The **computers** on some operational treatment sites are **20 years old**. Whilst the software has been supported and upgraded, they are potentially vulnerable to the latest sophisticated, **cyber-attacks**. If these computers are successfully attacked and they fail, the operation of these sites may be affected.

Suburban sewers

A **suburban area of 1930s semi-detached houses** has had a few issues with **sewer collapses** causing nasty sewage spills into the road and some front gardens over the last few years. The **collapsed sewers have been repaired** but **camera surveys** show that quite a few of the **other sewers in the area are also in poor condition**. During **heavy rainfall** it is not unusual to see **water spilling out of manholes** and the **local sewer overflow sometimes spills into a stream on rainy days**.

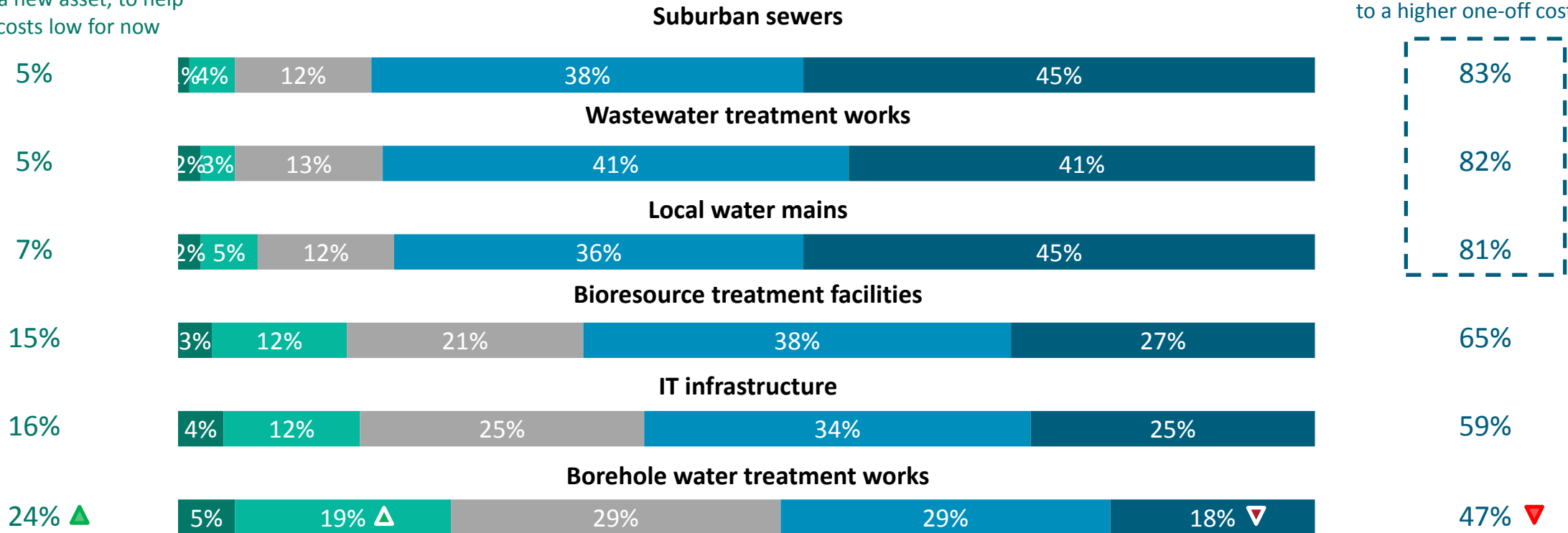
Bioresource treatment facilities

A bioresource treatment facility is **30 years old** and is unable to produce the best quality fertiliser or to produce much renewable electricity. It also gives off much more **greenhouse gas** than a modern treatment facility. Whilst it is still safe to operate, the assets are approaching the end of their design lives and may present an increased **safety risk** in the future as they produce **hot, explosive gases**.

When answering on hypothetical scenarios, assets related to direct water supply and sewers remain a key priority for higher cost replacement.

Spend the least possible now, accept it might not be as reliable as a new asset, to help to keep costs low for now

Replace it when it becomes unreliable, even if this might lead to a higher one-off cost



▲ ▼ Triangle: Significant difference at 95% conf. level.

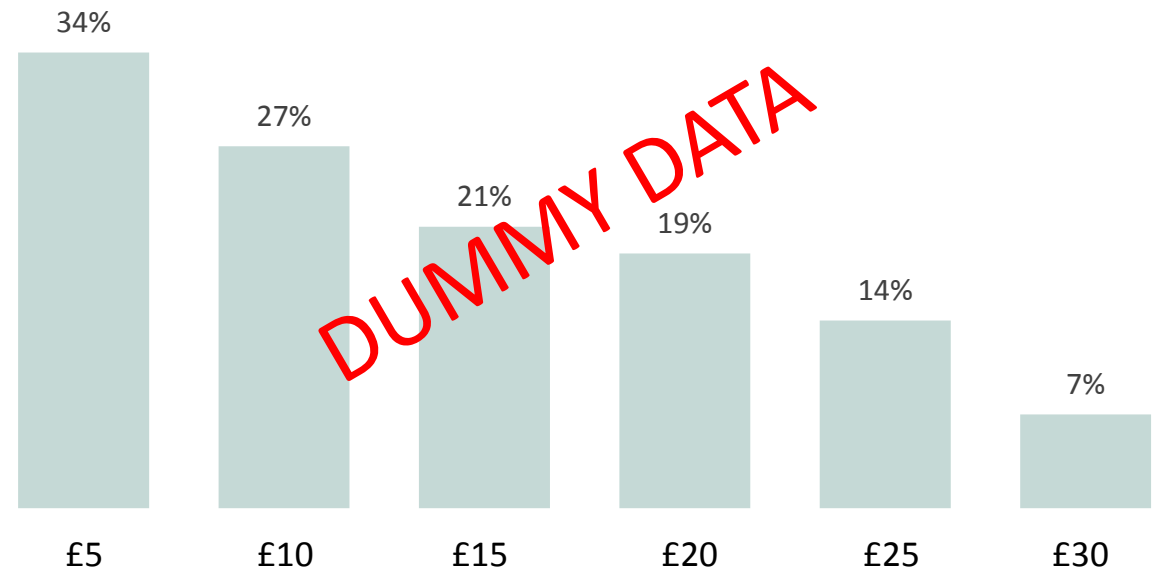


We used a Gabor Granger exercise to understand the amount customers would be willing to pay per month for you to invest in upgrading assets.

Rather than giving a single, ideal price point, a Gabor Granger exercise helps us to make a judgement call on the balance between raising the call-out fee and potential drops in purchase intention.

The percentages shown represent the proportion of United Utilities customers who are willing to pay extra on their monthly bills to enable United Utilities to take a proactive approach in maintaining their assets.

For example, on the chart to the right, 27% are willing to do so at £10, while only 7% are willing to do so at the £30 price point.



84% of customers are prepared to pay an extra £2 per month for proactive maintenance, with support for bill increases remaining high up to £6 per month (almost 7 in 10).



▲ ▼ Triangle: Significant difference at 95% conf. level.

What does this mean for UU moving forwards?

Executive overview

- It is widely believed that customers have little interest in how services are provided as long as they are affordable and efficient. If this is true, it is a difficult challenge to demonstrate customer support for improving asset health, especially in the current environment of falling bills and improving service.
- This research has focused on testing the assumption that customers 'aren't interested' in how United Utilities looks after its asset base, as well as addressing two specific questions:

1

Do customers support a proactive approach to maintaining and replacing assets to ensure higher reliability, or do they support a more reactive approach associated with lower bills in the short term?

2

Do customers care about intergenerational inequity in the funding of asset maintenance?

Executive overview

- Some strong learnings emerged from the research in response to these questions:
 1. While customers by no means fully understand the extent or scope of how the business manages its asset base, and the mechanics of service provision aren't front of mind for them, when asked to consider the issues they do appear to 'care' about them (as is also the case when confronted with service disruption). Having an infrastructure in good condition and that works efficiently is important to most customers. Only one in four surveyed actively claims they 'do not care' how assets are managed.
 2. When reviewing UU asset health scenarios, customers go beyond learnings about their own assets (e.g. car, roof, boiler), and point to a number of factors they expect the business to consider. Some of these considerations relate to immediate impact on services and some relate to future service needs scenarios; these are often well thought through. Overall, the majority are in favour of proactive maintenance and are accepting that an increase in bills is required to support this.
 3. A substantial majority of customers are willing to support good proactive maintenance practice and service delivery through their bills. Customers are most prepared to pay an extra £2 p/a on their bills, with support steady up to £6 p/a— yet bill increases above this limit are more polarising. Only one in four feel that UU should prioritise keeping bills as low as possible.

Customers take a number of factors into account in thinking about how United Utilities should maintain its asset base

Future population density

If an area keeps growing, what impact will this have on the need for future maintenance?

Impact on the customer

How are customers impacted? How many people will be impacted by each option? What about inaction?

Immediate vs long term impact

What will be the frequency/length of disruptions? What if nothing is done?

Changes to area and landscape

How will this change the area? What are the environmental implications?

Public health and safety

What impact will each option have on public health and safety? What if nothing is done?

Future network requirements

How much work will need to be completed in the future if this option is selected?

Prioritisation of other work

There's an understanding that these scenarios don't exist in isolation... what other work may need to be prioritised?

Appendix

Sample profile – Quantitative research

Total

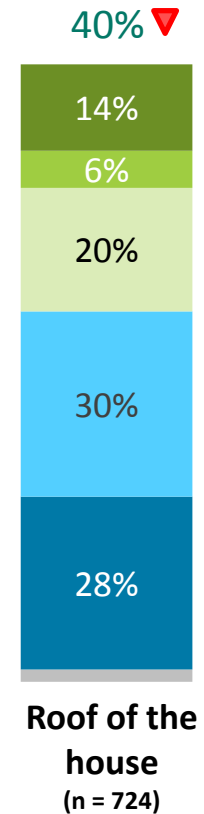
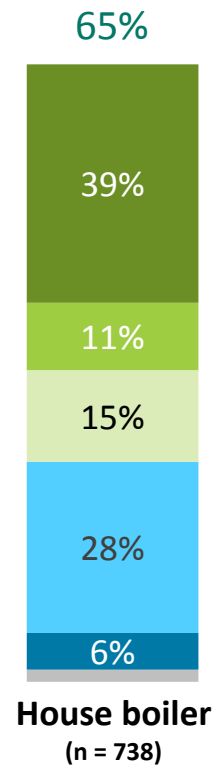
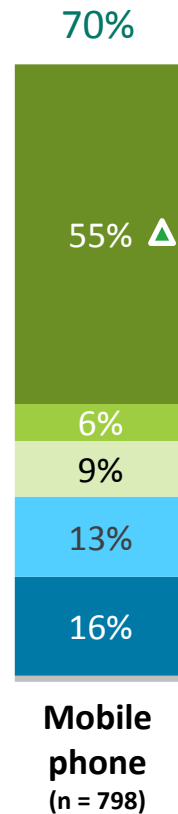
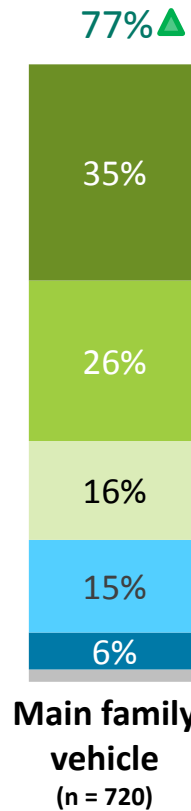
(n = 832)

Gender			
Male	67%	560	
Female	32%	268	
Age			
18 – 34	5%	38	
35-54	19%	159	
55+	70%	582	
Unknown	6%	53	
Region			
Greater Manchester	38%	314	
Lancashire	21%	174	
Merseyside	19%	156	
Cheshire	14%	119	
Cumbria	8%	64	

Assets that are most actively used – such as vehicles and smartphones – are those that are most commonly front of mind.

NET: At least once a month
(Top 3 box)

- Daily
- Weekly
- Monthly
- Annually
- Less often
- Not applicable to me



Females are most likely to think about all of their assets on a daily basis. Those aged 55+ are less likely to frequently think about their mobile phone and vehicle

▲ ▼ Triangle: Significant difference at 95% conf. level.

Hidden assets can quickly become visible, causing a shift from reactive to proactive maintenance

Hidden assets can quickly become visible if...

- Customers experience an issue with that asset
- They experience an issue with another asset that forces them to think about how they maintain other assets
- A family member/friend experiences an issue, which reminds them their asset exists and should be maintained



It's often the **emotional impact** (stress and anxiety) caused by an issue that forces customers to think proactively about that asset in the future.



Case study: Meet Gareth...



Gareth lives with his wife and two children. A few winters ago his boiler unexpectedly broke down in winter and his family were left for a week without hot water or heating. The stress caused by the situation made the boiler front of mind and forced Gareth to learn more about his boiler and think about how he can proactively maintain the boiler (and his other assets) in the future.

Our boiler just completely broke down that came with the house and we didn't have heating for a full week. It was one of the hardest times because it was during winter as well [...] we paid a lot more to get one with 10 years warranty – we didn't want to live in coldness again and I now know way too much about boilers than I'd like to.

Male, 18-34, Higher Income



The majority of customers do take action to maintain their mobile phones and will often replace them before they are unusable

Maintenance

How do customers maintain their mobile phones?

Customers will employ a series of preventative measures (phone cases, screen protectors, insurance, software upgrades) to ensure the phone stays in working condition. They are willing to pay a bit upfront to ensure they don't have to pay a large sum (e.g. for a new screen) later down the line.

Replacement

At what point do customers replace their mobile phones?

Customers recognise the 'built-in obsolescence' of modern mobile phones and therefore expect to have to replace them every 1-3 years. Many will take advantage of upgrades and will upgrade their phone to a newer model to get better features, even if their existing phone is in good working condition.



Attitudes towards mobile phone maintenance and replacement differ by age group and engagement with technology

Mark works in IT and is an early adopter of tech. He is always looking for the latest and fastest model and would upgrade his phone prematurely to get the newest features.

*It's definitely a luxury purchase, it's very much a hobby for me, I'm interested in technology, I care about that sort of thing.
Male, 18-34, Lower Income*

Jeff only uses his phone in emergencies and only needs it to make calls or send text messages. He will only replace his phone when it is completely unusable.

*I only replaced my last phone because the screen on it completely packed up. If it was still working, I'd have kept the phone, because I only use it 4 or 5 times a year.
Male, 35+, Lower Income*



Customers do the minimum to ensure their car is in working condition but will take necessary actions if the car becomes unsafe

Maintenance

How do customers maintain their cars?

Aside from the yearly MOT and having insurance, few people are proactively maintaining their cars' working condition. They may, however, make cosmetic improvements (e.g. washing it or cleaning it) but the internal mechanics are hidden and not top of mind.

Replacement

At what point do customers replace their cars?

Customers expect their cars to last them 10+ years and therefore are reluctant to replace them before then unless they absolutely have to and the car becomes unsafe (particularly important for those with children). However, as safety is a primary consideration, they are unlikely to 'run it into the ground' as this is too risky.



Safety is the primary consideration factor when customers think about their cars

Customers are more likely to be proactive when it comes to replacing their car as they know it may impact others if it's unsafe. When it's a question of safety, they're willing to pay.

My car is about 15 years old now, so I'm not going to replace it until it actually needs it. I would keep it going until it's reached that point where it's not reliable anymore. I think it's the fact that if it's still working and safe, why would you need to replace it? If it's still functioning and doing the job that you want it to do, why would you worry about upgrading or replacing it? And the expense associated with that.

Female, 18-34, Higher Income



Boiler maintenance is rarely top-of-mind for customers until there is an issue

Maintenance

How do customers maintain their boilers?

For the majority, a boiler is something customers don't think about until there is an issue. As such, those who have never experienced issues (especially those renting) are unlikely to proactively maintain their boiler. Those who have had previous bad experiences (e.g. no heating in winter) are more likely to have it checked once a year.

Replacement

At what point do customers replace their boilers?

As the financial implications of replacing a boiler are high, customers will only replace their boiler when it's stopped working completely, becomes unreliable or becomes unsafe. Those with an unreliable boiler may 'upgrade' to better features (e.g. a combi) if the features are deemed to make their lives easier and mean their boiler is more efficient, resulting in reduced bills further down the line.



Attitudes towards boiler maintenance and replacement may differ by life circumstance (i.e. how many people are in the house) and income

Ali has had the same boiler for years and believes old boilers are more durable than modern ones. He doesn't see a reason to replace it until it's completely broken as feels a modern one won't last as long.

I'm happy keeping my old boiler (an old one) until it runs out. While it works, no worries. Why would I want a new one?

Male, 35+, Lower Income

Rosa lives with multiple people and would only have access to hot water at certain times. She decided to upgrade to a combi for improved features and reliability and can now have a shower whenever she wants. This will also save money later down the line.

We upgraded to a combi and the savings that you make over the years having a combi, even though it was a huge up front cost, it will save me money for years down the line because it is more energy efficient.

Female, 18-34, Higher Income



Customers do not proactively maintain their roofs, but when an issue arises they are willing to pay more to prolong having to replace it again

Maintenance

How do customers maintain their roofs?

Similar to a boiler, customers are very unlikely to proactively maintain their roof until they notice an issue (e.g. a leak or broken tiles). However, those who have had issues in the past will actively monitor its condition by inspecting it themselves or have it checked periodically. It is noted that 'invisible' leaks or problems can cause damage within the home, that may go unnoticed for some time.

Replacement

At what point do customers replace their roofs?

A roof is viewed as functional item that either works (i.e. is still attached and doesn't let water in) or doesn't work. Customers are extremely unlikely to replace their roof unless they come across an issue. However, at this point, many will decide to pay more to redo the whole roof (rather than just a section) to give them peace of mind that they won't have to deal with the issue again for 15-20 years.

Issues with roofs are seen to have knock-on effects and impact the inside of the home too. For this reason customers are more likely to pay more to solve the issue and protect them for the long term.

Case study: Meet Debbie...



Debbie had to get her roof fixed last year because quite a few of the tiles had come unstuck and there was a leak in the loft. Thinking about the future, she had a chat with the roofer and said, 'We don't want to ever have to call a roofer out for this problem again, what can we do?' He said, 'If you paid a bit extra you could get this other thing that will last a lot longer, it's just more expensive.' Debbie decided it was worth paying the extra to make sure that it lasts and saves money in the long run.

I feel like if your roof goes wrong it's not just your roof. You then get a leak. Then you have to replace internal ceilings. It feels like there're a lot of things that could go wrong from that one thing breaking down.

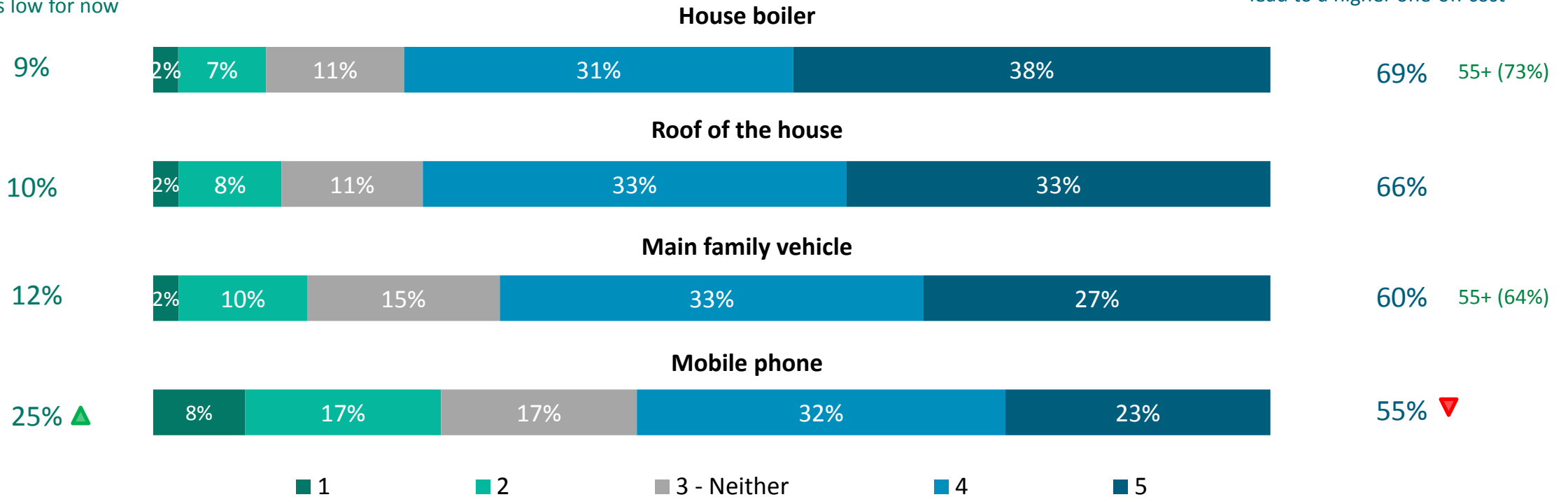
Female, 18-34, Higher Income

Finding are supported in the survey research; ‘bigger’, but less front of mind assets are more likely to be replaced when problems occur, as the potential detriment resulting is greater.

Spend the least possible now, accept it might not be as reliable as a new asset, to help to keep costs low for now

Older customers are more likely to consider replacement of boilers and vehicles to prevent any issues (and may be more likely to have experienced issues in the past)

Replace it when it becomes unreliable, even if this might lead to a higher one-off cost



▲ ▼ Triangle: Significant difference at 95% conf. level.

Scenarios shown and discussed with customers in qualitative research



Example 1: Wastewater Treatment Works

A simple **wastewater treatment works** was built in **1950**. It serves a **small village of about 500 properties**, which has expanded from about 250 properties in the fifties.

Since the water industry was privatised in the late 1980s **the works has been expanded with improved treatment**. The stream that receives the treated sewage is now much healthier and supports more wildlife than at any time since the industrial revolution.

The **original assets** from the 1950s are **past their useful lives** and regular failures mean that they are no longer able to fully treat the sewage during heavy rain; the works is starting to fail with treated samples sometimes not meeting standards. **There is no modern technology on the site and performance is managed by regular visits by an operator.**

Things to consider

- Without modern technology, failures may only be noticed after they have damaged the stream
- Manning sites is expensive with lots of unproductive time spent travelling between small sites
- Old assets will only get more unreliable, and eventually will be a health and safety risk to staff and the public
- Pumping sewage is expensive, but is often cheaper than locally treating it
- Cheap solutions usually need frequent additional spend in the future

Options

	Relative Cost
1 Rebuild the works	££££
2 Build a pumping station, shut the works and transfer the sewage through a new pipe to another site a mile away	££
3 Build a reedbed alongside the works on some land UU already owns to provide extra "natural" treatment	££
4 Replace the failing mechanical assets, but keep using the old concrete tanks and channels	££



Example 3: 1930's Sewers

A **suburban area of 1930s semi-detached houses** has had a few issues with **sewer collapses** causing nasty sewage spills into the road and some front gardens over the last few years.

The **collapsed sewers have been repaired** but **camera surveys** show that quite a few of the **other sewers in the area are also in poor condition**.

During heavy rainfall it is quite normal to see water spilling out of manholes and the local sewer overflow often spills into a stream on rainy days.

Things to consider

- Laying new rainwater systems is expensive in a built up area
- 1930s sewers are approaching 100 years old. They have served well, but they are starting to fail.
- Heavy rain squeezes sewers, causing them to fail faster
- Spills of sewage into streams can damage wildlife.

Options

	Relative Cost
1 Relay all of the sewers with separate rainwater and sewage systems	££££
2 Lay a new rainwater system but keep the old sewers for sewage	£££
3 Survey and replace the parts of the sewers in the worst condition.	££
4 Install monitors to warn United Utilities of problems so that they can respond quickly.	££



Example 2: Local Water Mains

A **busy urban area** has **water supply pipes** laid in the **1930s**.

The **publicly owned pipes** are made of **cast iron** and are now **90 years old**.

There have been **increasing instances of discoloured water** in some of the houses over the last few years and it is becoming a regular sight to see a van, barriers and a hole in the road as a burst pipe is repaired.

However, **water supplies interruptions are rare and relatively short**, due to the fast response of the gangs and the availability of "water on wheels" supply tankers. Many of the local properties still have lead pipes; these are owned by the homeowners.

Due to the increasing water quality contacts and the number of repairs being carried out the area has now been identified as a priority for investigation.

Things to consider

- There is a trade-off between regular minor disruptions and a single major programme of road closures.
- The different options will need repeating at different times
- Replacing pipes is likely to cost twice as much as relining the pipes
- Reducing water pressure will mean showers are less powerful and baths and sinks will take longer to fill.

Options

	Relative Cost
1 Replace all of the pipes in the area, the new pipes should last at least 60-80 years. There would be a rolling programme of partial road closures and traffic lights for 6 months.	££££
2 Reline all of the pipes in the area, linings should last up to 20 years, but there is little local experience of using them. There would be a rolling programme of partial road closures and traffic lights for 6 months.	£££
3 Clean the pipes to remove rust and dirt, reduce the water pressure and install monitors to predict leaks before they are noticed by customers.	£



Example 4: Borehole Water Treatment Works

A **small water treatment works** gets its water from **3 deep wells (boreholes)** before treating it, for use in the local area.

The boreholes were drilled **50 years ago**.

The **assets on the site are approaching the end of their useful life** and the pumps are **starting to become unreliable**.

The **electrical panels and switchgear are old** and don't meet the latest standards.

Also **the water is quite hard** and leads to scale build up in showers, kettles and pipes.

Things to consider

- Demand for water can increase by up to 50% during really hot days, spare capacity is really important
- Water from underground is more reliable than water in reservoirs, even in hot summers
- Small sites are relatively expensive to run
- Sometimes people don't like borehole water due to taste and the potential for scaling over time

Options

	Relative Cost
1 Upgrade the site to modern standards	££££
2 Replace the pumps and electrical equipment. Send the water for treatment at a bigger works	££
3 Mothball the site with limited maintenance, knowing that if it is needed in a drought it is likely to need a lot of investment	£
4 Abandon the site	£

The following scenarios were also shown in the quantitative phase of research.

Wastewater Treatment Works

A wastewater treatment works receives sewage, rainwater and wastewater from homes and businesses. This is then treated to make it safe, the solids are removed and the cleaned up water is discharged back into the environment.

Borehole water treatment works

Boreholes are deep wells in the ground from which water companies extract groundwater. This water is then treated to make it suitable for drinking. They are part of a mix of water sources including reservoirs and rivers, used to supply water to homes and businesses. They are often used during times of high demand, such as during hot, dry summers.

Local water mains

Water mains are the underground pipes that supply drinking water to homes and businesses in an area. They are made of different materials, depending upon when they were laid, often older houses are served by older pipes, although many have been replaced since the late 1980s.

IT infrastructure

IT infrastructure includes all of the hardware and software needed to run a modern utility company. From computers to help operate treatment works to billing systems and all of the other modern high tech equipment, silently operating behind the scenes.

Suburban sewers

Sewers are underground pipes that carry away wastewater, sewage and other things that homes and businesses put down their drains. They all eventually lead to your local wastewater treatment works.

Bioresource treatment facilities

Bioresource treatment centres treat and dispose of sewage sludge. They process the sludge to create natural gas, generate renewable electricity, and fertiliser for crops; helping to return the nutrients from our food back into the environment in a safe and sustainable way.

The WaterTalk panel

- Water Talk is an online community designed to reflect the views of those in the North West who have access to the internet (circa 90% of the population)
- Customer panels typically provide a deeper level of engagement with customers than ad-hoc pieces of research
- It provides rapid research access to UU customers
 - This can provide fast and cost effective feedback on a wide range of issues
- Where appropriate, work is supported with other methodologies and samples to represent those not present on WaterTalk
- Nearly 8,000 UU customers are on the panel:
 - 3,600 have taken part in a research activity in the last 6 months

To find out more about using the WaterTalk panel to meet your business needs, please contact **Shy Sharma**:



Shy Sharma

Customer Insight and Exploration Manager

Shy.Sharma@uuplc.co.uk