

**Bristol City Council
Permit Scheme
Year 1 Evaluation**

Document Content

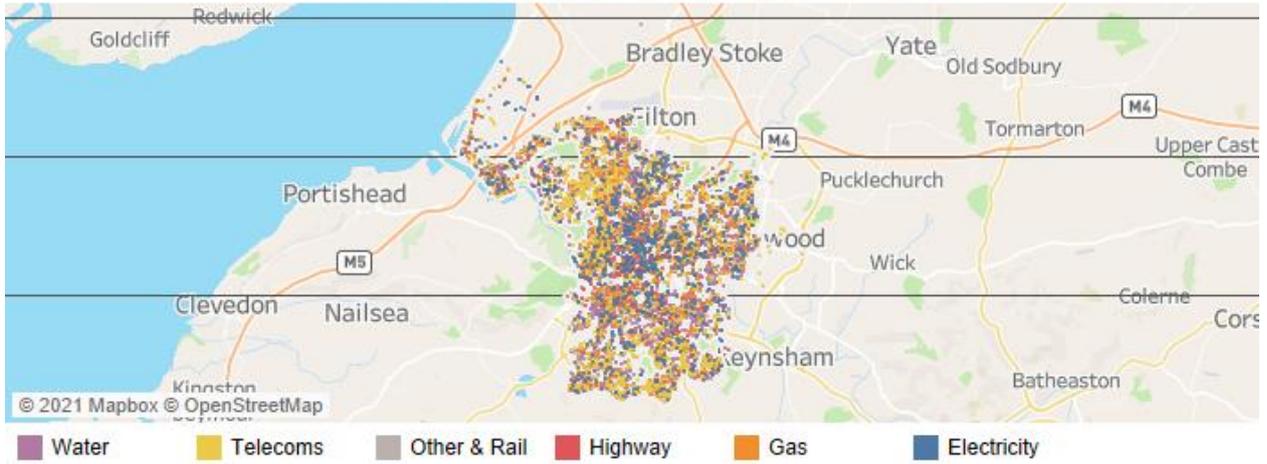
Key findings	1
Executive summary	2
Legislation context	2
The network management duty and permit schemes	2
Regulatory requirement for a permit scheme evaluation	3
Summary of Year 1	4
Evaluation methodology	7
Work phases.....	7
Duration analysis and adjustment	7
Economic cost-benefit analysis	9
Analysis of work applications	10
Application lead time and publicity	11
Early start agreements	14
Analysis of work coordination	15
Responses to permit applications.....	15
Changes applied during the life of a permit	17
Collaborative works	19
Permit variation (alterations or change requests)	19
Analysis of work undertaken	21
Final work status.....	21
Analysis of duration over time	22
Analysis of Major work.....	22
Analysis of Standard work	23
Analysis of Minor work.....	23
Analysis of Immediate work.....	24
Activity type	24
Work exceeding planned duration.....	26
Use of traffic management	28
Reinstatement.....	28
Analysis of permit conditions	29
Conditions for Date & Time Constraints	30
Cost impact analysis of condition NCT2a.....	31
Conditions for Material and Plant Storage.....	32
Conditions for Road Occupation	33
Conditions for Light Signals and Shuttle Working.....	35



Conditions for Traffic Management Changes	36
Conditions for Work Methodology	38
Conditions for Consultation and Publicity	39
Conditions for the Environment (Noise)	39
Local Conditions	39
Analysis of permit compliance.....	40
Analysis of cost and benefit.....	42
Cost for operating the scheme	42
Scale and characteristics of works for analysis	43
Quantification of benefit of a permit scheme	44
Appraisal Results.....	44
Emissions savings	46
Glossary and common terms	47
References.....	49

Key findings

Map showing the works undertaken in year one



17,435 applications for work in year one⁽¹³⁾



Average cost impact of £474 per day of work⁽⁴⁶⁾



11,877 works undertaken across Bristol⁽²⁴⁾



Year one scheme benefit of £1.26 million⁽⁴⁷⁾



53,592 days with highway occupation⁽²⁴⁾



33 works starting every day⁽²⁴⁾



59% of works undertaken with a permit condition⁽³²⁾



Annual carbon emission savings of 1,465 tonnes CO2 from reduced delays⁽⁴⁸⁾

Figures quoted are based on the rounded average or total figures for operational year one. The figure in brackets represents the page number where the relevant figure is explained.

Executive summary

Legislation context

The network management duty and permit schemes

In 1991 the New Roads and Street Works Act (NRSWA) placed a duty on the Council, as a highway authority, *to coordinate activities (works) of all kinds on the highway under the control of that Authority.*

In 2004 the Traffic Management Act (TMA) and associated secondary legislation widened the NRSWA coordination duty. The scope of this increased duty has the following main considerations and Part 3 of the TMA allows for an Authority [Council] to introduce a permit scheme to support the delivery of this duty.

- manage the road space for all users;
- identify current and future causes of congestion, and to plan and act accordingly;
- take a proactive approach to the coordination of works on the road, including unplanned emergency works;
- gather and publish accurate information about planned works and events;
- manage unforeseen incidents and events on the network;
- establish and implement contingency plans for incidents and issues; and
- manage cross-border network travel and demands.

The fundamental objective of a permit scheme is to create a common procedure to control activities on the highway. It is essential that all activities in the highway are effectively coordinated and managed to ensure that traffic disruption and inconvenience is minimised whilst allowing the Promoters of those activities, such as utility companies or the Council, the necessary time and space to complete their work.

Under the NRSWA organisations intending to carry out work on the highway notify the Council of their intention to carry out these works. The Council has powers to provide direction to these works and apply penalties for non-compliance, such as for instances where the works are not carried out according to the notice served.

The powers under a permit scheme enable the Council to take a more active involvement in the planning and coordination of works, from the initial planning stages through to completion. This includes:

- organisations book occupation for work instead of giving notice, essentially obtaining a permit for their works;
- any variation to the work needs to be agreed, before and after works have started, including extensions to the duration;
- the Council can apply conditions to work to impose constraints; and
- sanctions with fixed penalty notices for working without a permit or in breach of conditions (of the permit).

In March 2020 the Council introduced the **Bristol City Council Permit Scheme**. The scheme was brought into legal effect through an Order created by the Council under the provisions of the Traffic Management Permit Scheme (England) Regulations.

The Council forms part of the West of England Joint Local Transport Plan 2011 2026 (issued in March 2011). This West of England partnership comprises:

- Bath and North East Somerset Council
- Bristol City Council
- North Somerset Council
- South Gloucestershire Council

The vision for network management set out within the Plan includes:

- to provide a resilient, adaptable and well-maintained highway network...;
- to secure the optimum efficiently in motorised and non-motorised traffic movement on the highway network.

The increased control of works taking place on the highway through a permit scheme contributes greatly to the delivery of this vision. The introduction of a permit scheme also helps delivery strategic objectives set out within the LTP:

NM1- working with [other partners] to oversee the safe, effective and efficient use of the highway network;

NM5 – adapt the highway network through schemes and measures to ease congestion and increase safety ...

NM8 – enhance the highway network information available to the travelling public, businesses, the freight industry and service providers ...

Section 2.2 of the Permit Scheme details the objectives, which are primarily aimed toward improving the management of the road network through the better planning, scheduling and management of activities so as not to cause avoidable traffic disruption to any road user.

Wherever possible, this evaluation provides data and explanation as to how the Council has met the above objectives through the introduction of a permit scheme or how further operational changes may be applied to measure or deliver these objectives.

Regulatory requirement for a permit scheme evaluation

An amendment to the 2007 Permit Scheme Regulations saw the introduction of a new regulation (16A) which makes a provision for the content and timing of **permit scheme evaluations**

This regulation states that *permit schemes [should] be evaluated following the first, second and third anniversary of the scheme's commencement and then following every third anniversary*. The regulation further states that, *in its evaluation, the Permit Authority [Council] shall include consideration of:*

- whether the fee structure needs to be changed in light of any surplus or deficit;
- the costs and benefits (whether or not financial) of operating the scheme; and
- whether the permit scheme is meeting key performance indicators where these are set out in the Guidance.

This report has been developed by the Council to provide an evaluation for year one of the Permit Scheme and includes the provisions set out within the regulations.

The regulations reference key performance indicators set out in the Guidance – where the Guidance is the Statutory Guidance for Highway Authority Permit Schemes (July 2020 latest edition).

The Guidance reiterates the requirement from the regulations, adding each scheme evaluation must be made available to stakeholders (those consulted at the scheme development stage, as set out in Regulation 3) within three months of the date on which the evaluation was due.

In addition, Annex A of the Guidance contains a list of Key Performance Indicators, as outlined below:

- TPI 1 Works Phases Started (Base Data)
- TPI2 Works Phases Completed (Base Data)
- TPI3 Days of Occupancy Phases Completed
- TPI4 Average Duration of Works
- TPI5 Phases Completed involving Overrun
- TPI6 Number of deemed permit applications
- TPI7 Number of Phase One Permanent Registrations

To complement the Guidance, HAUC (England) has issued its guidance document for the Operation of Permit Schemes (August 2020). Similar to the Statutory Guidance, the HAUC Guidance reiterates the legislative requirement.

Section 14 of the HAUC Guidance, Scheme evaluation and Reporting, refers to a HAUC England Report template available on their website, however the HAUC UK website is currently unavailable and under development. As the Key Performance Indicators do not include any target values or accepted level of performance, an acceptable level is assumed for all measures.

Summary of Year 1

The initial year of the permit scheme is an opportunity to embed new ways of working and newly appointed staff to establish an efficient operation of the scheme for both the Council and those undertaking work across Bristol. For many of the utility companies working in Bristol a permit scheme is not new as they have been working under this regime elsewhere in the country. For the Council this is a new regime, as a network manager and as an organisation undertaking work, presenting new business change and challenges.

The permit scheme started as the first Covid measures were being introduced. From the outset and throughout year one the team had to manage a new scheme with unprecedented changes in the use of the network and working remotely. In addition 2021 saw the introduction of another vital network management change with Clean Air Zones, to ensure Bristol meets the limits for pollutions set by the Government.

Following a significant investment into Bristol from 2016 for both utilities and the highway, the number of applications for work in the years preceding the scheme were decreasing. This decrease continued into year one, the most significant being for Highways work. Whilst the drop for the utilities sector is viewed as a return to normal level of work for new connections, asset maintenance, etc. The reduction in applications for Highways work is mainly attributed to change in the use of systems to generate work notices, however the Council will need to monitor this over forthcoming years. They need to ensure a permit is obtained for all relevant works, including for their own highways work. The overall volume of work undertaken has also seen a reduction under a permit scheme, however this should not be viewed as an overall reduction in actual work. The main contributing factor to this reduction is the lack of Highway work being recorded (as a permit).

Using the permit scheme for the task of **managing the road space for all users** was demonstrated in year one through a number of permit scheme controls:

- 72% of provisional advanced authorisations (for major works) were granted, with the remainder being challenged or rejected because the lead time is insufficient;
- 19% of permit applications were rejected, mostly for missing permit conditions, location issues or the proposed traffic management not being properly defined or acceptable;
- 86% of work extensions were granted; and
- 68% of requests to change a permit were granted.

A permit scheme has also helped the Council **gather and publish accurate information about planned works and events**, with the application lead time for planned work (before work start) increasing under a permit scheme and remaining over the minimum required.

The permit scheme enabled the Council to **take a proactive approach to the coordination of works on the road, including unplanned emergency works**. Analysis of the application process shows many changes being made to planned works before start, including 1,711 works with a condition change and 235 works with a traffic management change.

Further analysis of work duration, from initial application through to actual work undertaken, shows a positive reduction under a permit scheme. Supporting this is a decrease in the average duration for Standard and Minor work. There is a noticeable increase for immediate work average duration which is an area the Council will need to focus their attention.

Work exceeding planned duration has dropped significantly under a permit scheme, from 1,137 works (8,824 additional days) in the year preceding the scheme, to 175 works (1,593 additional days) in year one.

Although it is difficult to directly attribute any duration changes to a permit scheme, comparing the same analysis for the pre-scheme year (year -1) and year 1 shows a bigger decrease in planned and actual duration under a permit regime than the previous notice regime. The introduction of Street Manager and regulatory changes in July 2021 providing the capability to analyse durations through actual times of works, instead of calendar days, and also a define activity type will enable a more detailed analysis in future evaluations.

It is paramount for the Council and Promoters to ensure work is undertaken using the most appropriate form of traffic control, to achieve the necessary safety for the road users and work operatives, whilst balancing the potential impact. The initial year under a permit scheme already shows a change in the traffic control deployed for work, with a decrease in “some carriageway incursion” and an increase in “no carriageway incursion”. Through the use of application checking and challenges the Council has ensured traffic management details are clearly defined and any possible incursion on the carriageway, *such as a work vehicle or plant, materials or spoil*, is off the carriageway to avoid traffic impact.

Getting Promoters to collaborate with their work, either sharing traffic management or working site, is a national challenge. Under a permit scheme there have been 69 collaborative works, accounting for 868 days of collaboration. This is a very positive step in network management to demonstrate the collaboration can be achieved and should hopefully improve under a scheme.

The application of conditions is one of the key controls a permit scheme to deliver the objectives. In year one 59% of all work undertaken included a permit condition. Analysis shows that:

- 3,886 works (one in three) had a condition to control the timing of works, with the majority of these applied to short duration work on the more strategic roads;
- An estimated reduced impact cost to society of £1.25million can be attributed to the use of this timing condition alone;
- 1,260 works were undertaken with a condition to control the road space that could be occupied;

- 450 works involving temporary traffic lights (52% of the applicable works) were undertaken with a condition to ensure the lights were removed after use and not left out on site.
- 232 of works involving temporary traffic lights had to be manually controlled at times specified by the Council.

Analysis shows that many of the permit conditions are already added by Promoter on their applications, however the Council also ensure those missing are added during the application and review stage. The use of permit conditions is an area that will develop over years of operation as the Council better understand how to apply the right conditions for the desired outcome.

Across all Promoters there was a good compliance to the permit scheme in year one. 239 works were identified as working without a permit, thereby receiving a penalty for the offence, and 267 works were identified as being in breach of a permit condition, thereby receiving a penalty for the offence. Analysis of the offences overtime shows a steady trend instead of a high point at the start of the scheme, which would indicate the need for the Council to continue inspections to ensure compliance.

Analysis of the costs and benefits for operating the scheme shows an overall deficit of £138,000 between the income, *from permit fees*, and the additional cost to operate the scheme. Taking into consideration the unprecedented first operating year, *which would have impacted permit application volumes*, and further potential changes to the operating model, the Council will reevaluate the permit fee levels over forthcoming years of operation. Any adjustment to the permit fees will be made if there is a sustained deficit.

The estimated permit scheme benefit, as a costed reduction from the impact of works to the Bristol society, is £1.26million in year one. This produces an overall cost to benefit ratio of 9.38 which can be defined as demonstrating very high value for money. The cost to benefit analysis also estimates that the permit scheme has led to annual carbon emission savings of 1,456 tonnes CO² from reduced delays to vehicular traffic, which equates to 1.22million annual car kilometres of CO² reduction.

In summary, the analysis from the year one evaluation clearly demonstrated that the Council has established a good foundation for the permit scheme. This will enable them to focus on areas that need attention whilst continuing to deliver the objectives of the scheme and realise the benefits across the network. The future capability to analyse data in more detail, compare operating years and also assess impact to traffic and congestion levels should demonstrate the vital role for a permit scheme in network management.

Evaluation methodology

This evaluation uses data collected from both Street Manager and the Council's system to process and record works. The data collected contains the content of notifications sent between Promoters undertaking work, *such as utility companies*, and the Council.

Analysis of these notifications enables the Council to produce metrics for performance indicators and further measures. For some measures aggregating data for analysis does not provide an accurate picture of the results, *for example for the analysis of all work durations can provide a falsely inflated picture of changes over time*. This evaluation therefore delineates many of the measures into sub-categories, *such as works category*, to provide a more accurate result and trend.

Many of the measure contained in this evaluation were analysed with sub-categories to ensure accuracy in the results. These have not all been included within this evaluation report; however, it should be accepted that any findings presented have been tested for certainty and any anomalies investigated and defined.

Work phases

In this evaluation work is analysed in logical phases. A work is typically identified by a work reference number, which often applies to multiple phases of work, for example a work reference number may contain the following phases:

1. A work with a temporary reinstatement
2. A follow-up work changing the temporary reinstatement to a permanent reinstatement
3. A defect work to rectify a fault with the permanent reinstatement.

To logically delineate work phases, a phase is identified from the initial application through to work completion notices within the same work reference. Therefore, the analysis shown for work in this evaluation is for a work phase, *i.e. the total works undertaken are the total work phases undertaken*.

Duration analysis and adjustment

Analysis of works duration is calculated using the dates provided within the work start and work stop notifications, inclusive of these dates. As a result of poor notice administration spurious durations can be found within the extracted data, such as work with a negative duration or work with a significantly high duration.

Analysis of work duration is essential for this evaluation, for both an assessment of changes in work duration and to calculate a work impact cost (impact to society). Therefore, a process to cleanse duration involving the following 3 steps is undertaken. If the actual duration does not meet the criteria below then the duration is not revised.

1. Where an actual duration is a negative value, then this is replaced with the planned duration;
2. In the case of 1. if a planned duration is also a negative value, then a default value for the works category is used; and
3. Where the actual duration is more than 50% greater than the planned duration and the difference is more than a set value, based on the work category, then the duration is revised using the planned duration.

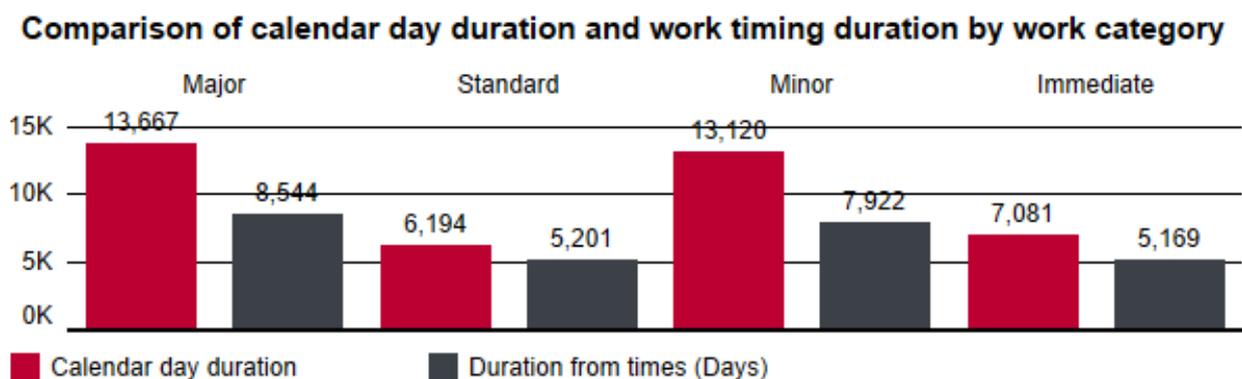
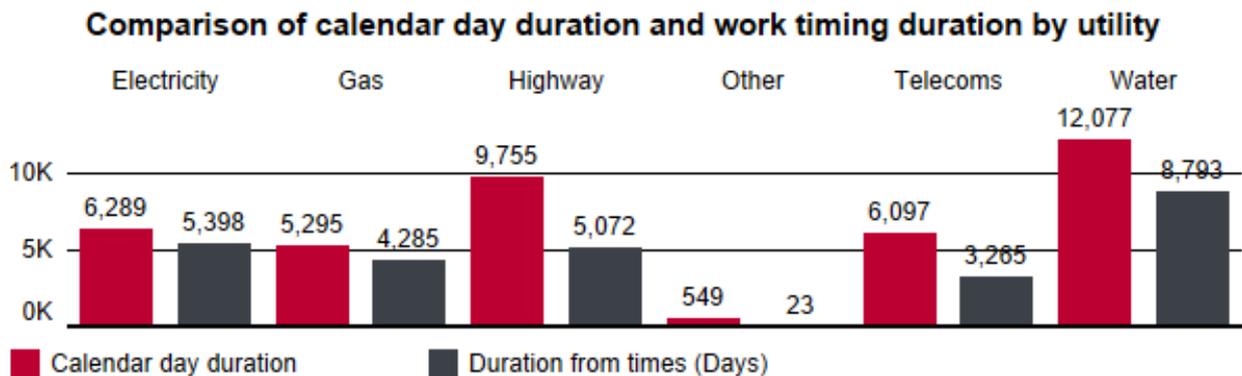
Since the introduction of the DfT’s digital service for the management of roadworks (Street Manager) and associated regulatory changes, information related to the timing of works, *i.e. start time and stop time*, has improved. As such since the introduction of Street Manager it is possible to measure and analyse durations closer to actual time than to a day period.

This report contains analysis of duration based on time wherever possible, however for a complete analysis of operational year one and to analyse results compared to previous years it is not possible to effectively use this. It is anticipated that future operating years will use analysis of duration based on work timings time, across far more effectively.

Since the introduction of the DfT’s digital service for the management of roadworks (Street Manager) and associated regulatory changes from 1st July 2020, information related to the timing of works, *i.e. start time and stop time*, has improved. As such since the introduction of Street Manager it is possible to measure and analyse durations closer to actual time than to a day period.

Analysis of total duration based on the notice dates (whole calendar day) and notice times shows that there can be noticeable differences between these two types of measure.

*The charts **Comparison of calendar day duration and work timing duration by utility** and **Comparison of calendar day duration and work timing duration by work category** show the differences between a calculated total work duration using the dates (calendar day) and times contained in the work start and work stop notices (legend). The charts show each comparison either by utility (top) or work category (bottom).*



For this evaluation, analysis of work duration and trend is predominantly based on dates of the work notices, not timings, as the pre-scheme historic data does not contain accurate timings. Future evaluations may contain analysis based on timing once the data range has increased over time. In addition, the use of activity type also introduced by Street Manager can be useful to consider the durations of specific activity and whether these are changing over time or remaining within accepted tolerances.

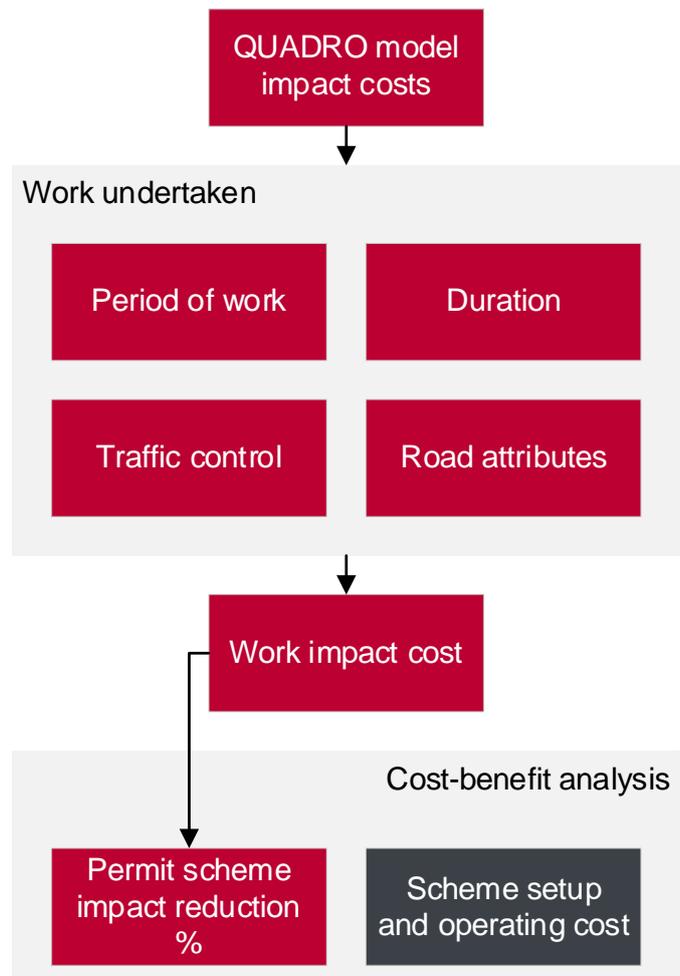
Economic cost-benefit analysis

A cost-benefit analysis (CBA) provides a framework in which the impact of a scheme can be compared against the cost of setting up and operating the scheme.

The evaluation of the permit scheme CBA provides opportunity to review the value of the scheme with the benefit of the outturn scheme operating costs and revenues, updated estimates of the societal impact of work and to compare this not operating a permit scheme.

The approach to the permit scheme CBA is as follows:

- identify the scale and characteristics and quantify the scale of societal impact these works will have had to the residents and local economy;
- estimate the reduction in impact resulting from the permit scheme and quantify the social benefit of this reduction;
- identify the cost of setting up and operating the permit scheme; and
- undertake the cost benefit analysis to determine the benefit to cost ratio and net present value delivered by the scheme.



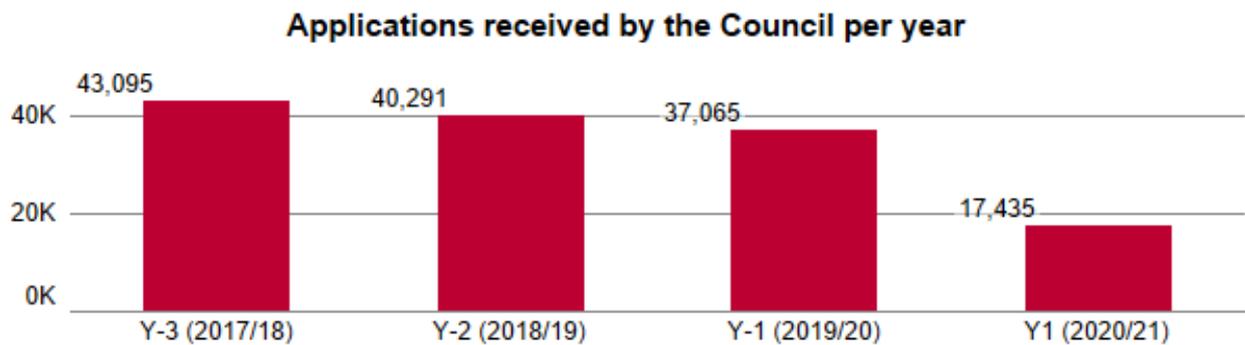
The societal impact of each work is estimated based on impact calculations derived from the **QUEUES AND DELAYS AT ROADWORKS (QUADRO)** model. This captures loss of time to travellers, increased vehicle operating costs because of idling in queues and/or diversion, vehicle emissions and accident impacts. Impact modelling is based on local traffic flow data (within the Council’s boundary), disaggregated by road type, to provide locally relevant impact values.

Analysis of work applications

All **registerable works**¹ require an application to the Council to obtain a permit. Prior to the introduction of the permit scheme, the Council was notified of these works.

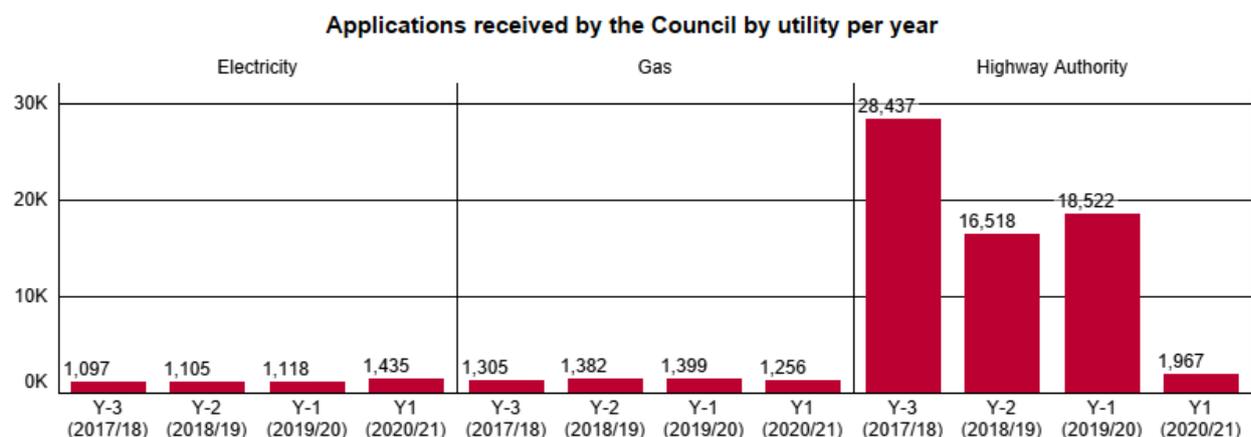
Throughout this evaluation the term **application** refers to both the initial notice for a work and also the application for a PAA or permit unless stated otherwise. Non-statutory forward planning notices are not included in this evaluation.

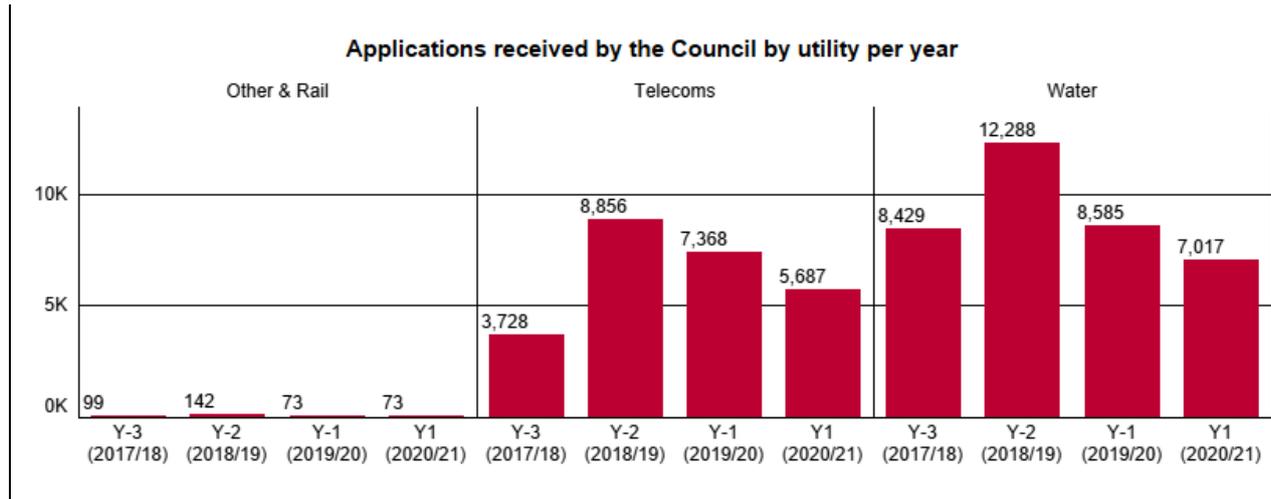
The chart **Applications received by the Council per year** shows the volume of applications (initial notices or permits) received for each operational year delineated by work category (legend).



Work Category	Y-3 (2017/18)	Y-2 (2018/19)	Y-1 (2019/20)	Y1 (2020/21)
Major	1,624	1,395	1,577	2,027
Standard	1,866	1,985	2,085	1,701
Minor	35,823	32,500	30,416	11,612
Immediate	3,782	4,411	2,987	2,095
Total	43,095	40,291	37,065	17,435

The charts **Applications received by the Council by utility per year** shows the volume of applications received by the Council by operational year for each utility type (legend).





The volume of applications received by the Council were steadily reducing before the introduction of the permit scheme, continuing into year one. Several factors have caused a spike in work during 2018/19 and the reductions are considered a return to normality.

The peak and drop in telecom utility related applications (and work) is attributed to an increase in new fibre installations between 2018 – 2020 as part of the F2P Fibre to Premise programme delivery.

The peak and drop in water utility related work is attributed to a period of infrastructure work and renewals under a general focus on improving Bristol’s water services. Over recent years, the Council has focussed on a misuse of the Immediate (emergency) category for planned work. In 2017/18 24% of all applications were for Immediate work, whereas in 2020/21 this was 13%, a decrease of nearly 10% (as a percentage of total).

A change to a Code of Practice for the coordination of work in 2020 saw a change in the definition of registerable work, effectively removing the requirement to register a work solely on the basis of using temporary traffic control. This would have resulted in a reduction in the number of work applications, which is difficult to quantify. .

As shown in the section **Analysis of work undertaken**, the proportion of applications resulting in actual work has increased from 65% to 81% in year one. This could also explain why the overall volume of applications has decreased as fewer applications are being submitted to obtain a permit to work instead of issuing a notice.

The most significant reduction in application is for Highways work. Prior to the introduction of the scheme, the Highways works system was setup to automatically issue a notice for all work undertaken, irrespective of whether a notice was required for the work (as a registerable activity). This was changed for the permit scheme whereby all applications would be manually created and not system generated.

The Council recognise that the volume of applications for year one is not a true reflection of the volume of work being undertaken and are engaged with ongoing discussions with the relevant departments to ensure any registrable work does have a permit.

Application lead time and publicity

For the Council to effectively carry out the coordination of works, including the advanced publicity of works, it is essential that applications are submitted with sufficient lead time based on the work category, as set out within primary legislation.

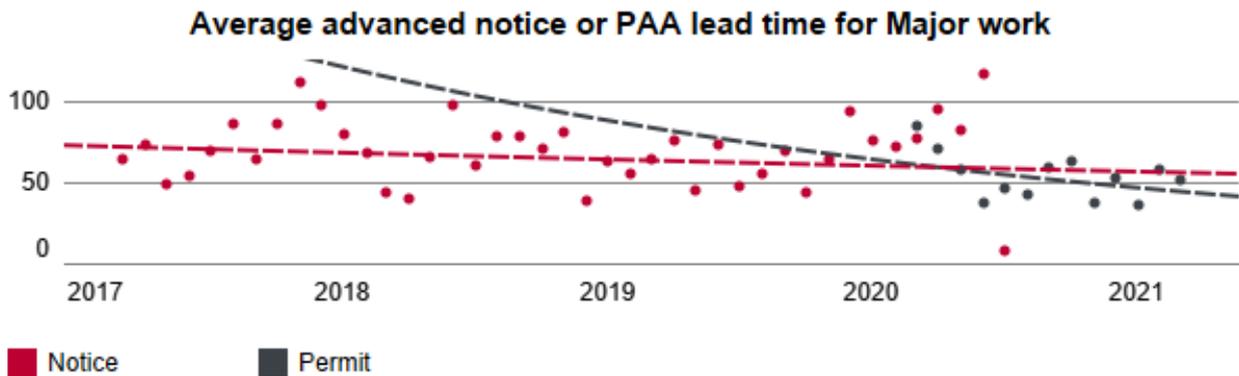
The Council publishes all planned and active works through a public facing website one.network, enabling them to inform the road users and all affected parties on the advanced warning and status of works.

A work will appear on one.network as soon as it is received, so it is therefore essential for works to be given the earliest visibility to the public through application lead times. In addition to showing planned and active work, the Council use one.network to show all road closures and diversion routes.

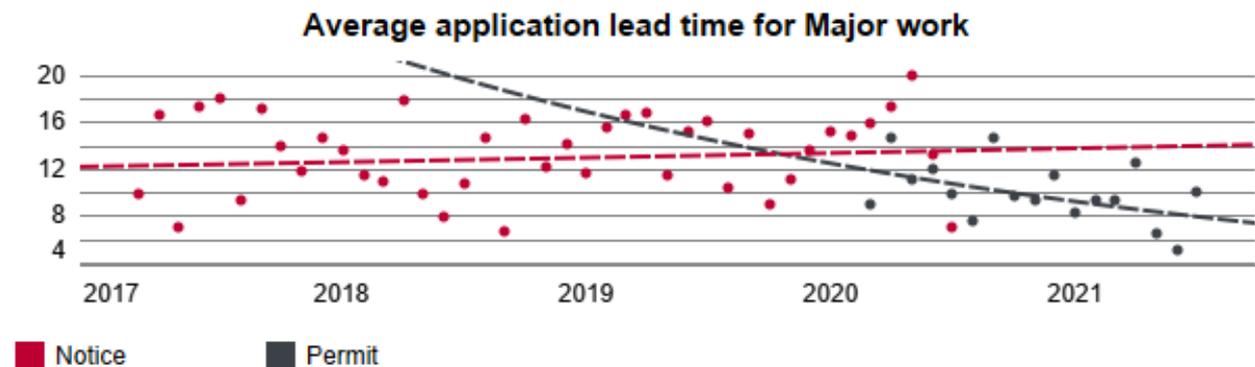
The introduction of the permit scheme has placed more control with the Council to refuse an application where the minimum lead time has not been provided, or it is considered that more notice is required when reviewing the potential impact of the works to road users and other affected parties, such as bus operators, local residents or business.

The charts below show the aggregate average application lead time across the period of analysis, together with a linear trend model (line) which is computed from a natural log of lead time for each of the observed 51 points (months). To reduce any anomalies for the analysis of lead times only applications with a lead time between 1 and 100 days for notices and permits and 1 to 250 days for major works advanced notice or PAA were included. In addition, only the first or unique applications are analysed, subsequent application or multiple applications are not included as these would introduce a bias.

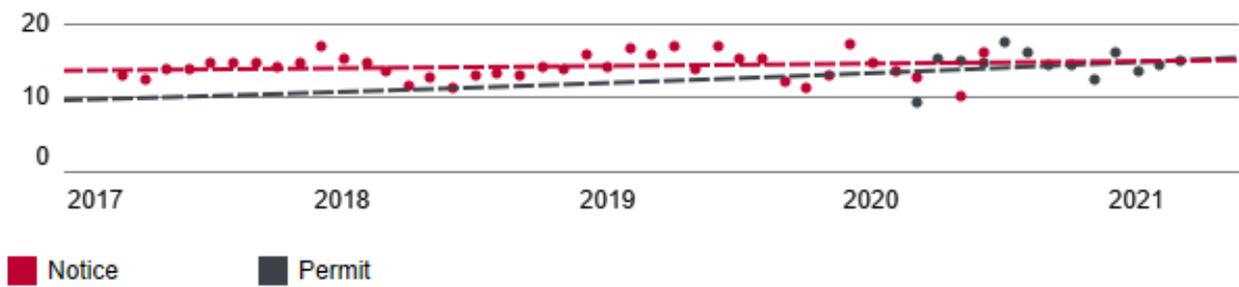
The chart **Average advanced notice or PAA lead time for Major work** shows lead time (calendar days) for an advanced 3-month notice or a PAA for the Major works across the operational years of analysis. Applications are delineated into notice and PAA to compare the two different regimes (legend).



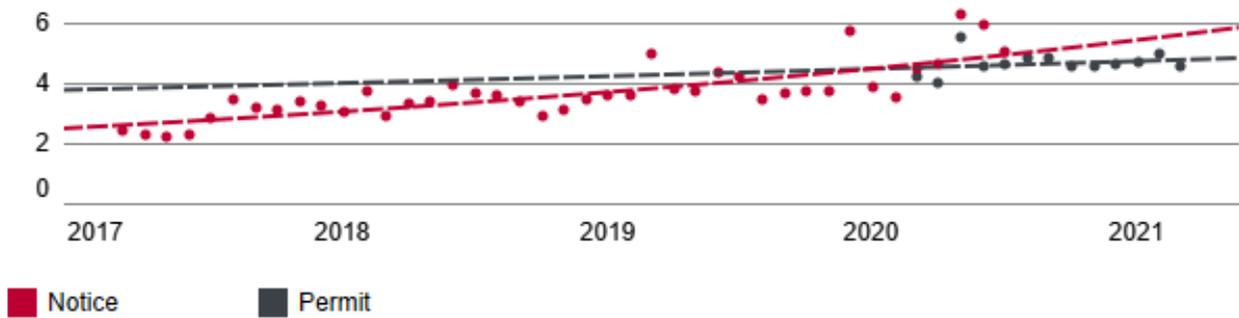
The charts below **Average application lead time for [Work Category] work** shows lead time (working days) for either a notice or permit application for the stated work category across the operational years of analysis. Applications are delineated into notice and permit to compare the two different regimes (legend).



Average application lead time for Standard work



Average application lead time for Minor work



Compared with applications under a notice regime, the overall average application lead times under a permit scheme are improving or remaining similar. The lead times are now above the minimum for each work category, especially for the high-volume minor work which increased under the notice regime from below the minimum and continues to improve.

The only exception to this is for the PAA and permit applications for Major works. On average these remain below the 90-day lead time minimum and there is a downwards trend for permit applications. As shown in the table below, even when comparing different work durations and traffic management types the first application for a PAA is typically below the minimum lead time.

The table Average lead time for PAA applications by traffic management type in year one shows the average lead time (calendar days) for PAA applications for each traffic management type, duration band of the work and whether it was a first, and only application, or a subsequent application.

Average lead time for PAA applications by traffic management type in year one

	Work Duration	No Carriageway Incursion	Some Carriageway Incursion	Passive Traffic Control	Positive Traffic Control	Lane Closure	Road Closure
First application	1 - 10 Days		10	36	54	36	41
	11 Days or more	59	50	78	67	53	74
Subsequent applications	1 - 10 Days		10		6		25
	11 Days or more	27	33	12	61	17	40
Grand Total		45	44	76	62	47	44

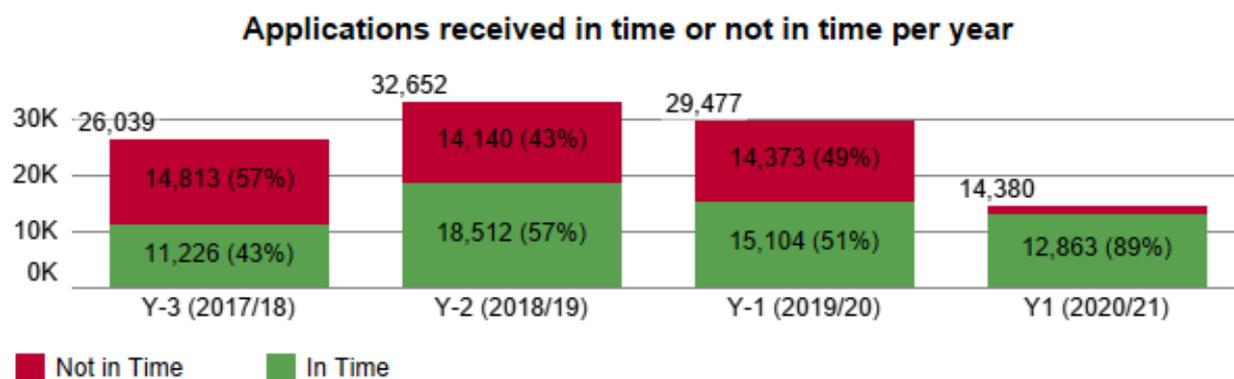
The application lead times for Major work is an area the Council will need to focus attention on for forthcoming years. In addition, as highlighted in the table above, the Council need to ensure that work is being given the correct work category as a work less than 11 days in duration involving some carriageway incursion is not a major activity.

Early start agreements

When a Promoter wishes to start planned work without providing the minimum lead time (for that work category) the Council has the discretion to allow an early start, *i.e. agreeing for the Promoter to provide less than the minimum lead time.*

There are many valid reasons why a Promoter may require this early start, *such as the availability of resources or changes to customer demands*, however the Council must get a balance between valid reasons for an early start and impact on the network, whilst not allowing the poor planning of work.

The chart **Applications received in time or not in time per year** shows the proportion of applications for planned work, not Immediate work, received in time or not in time (legend) in accordance with the minimum lead time (for the relevant work category) for each operational year. This chart only contains the initial application, not subsequent applications.



Prior to the introduction of the permit scheme on average 51% of applications for planned work issued to the Council met the minimum lead times. As shown in the table and the charts above this started to improve prior to the introduction of the permit scheme, and has significantly improved in year one, resulting in 89% of applications meeting the minimum lead time.

The table **Early start agreement response by utility in year one** shows the response (legend) to all applications not received in time for year one by utility.

Early start agreement response by utility in year one

	Electricity	Gas	Highway	Telecoms	Water	Total
Superseded or Cancelled	4	6	85	19	26	140
Refused	12	7	71	52	48	190
Granted	68	42	460	77	223	870
% Granted not superseded /cancelled	85%	86%	87%	60%	82%	82%

Of the applications received not in time, the Council is granting 82% of these on average. With the exception of the telecoms utility where the average is 60%.

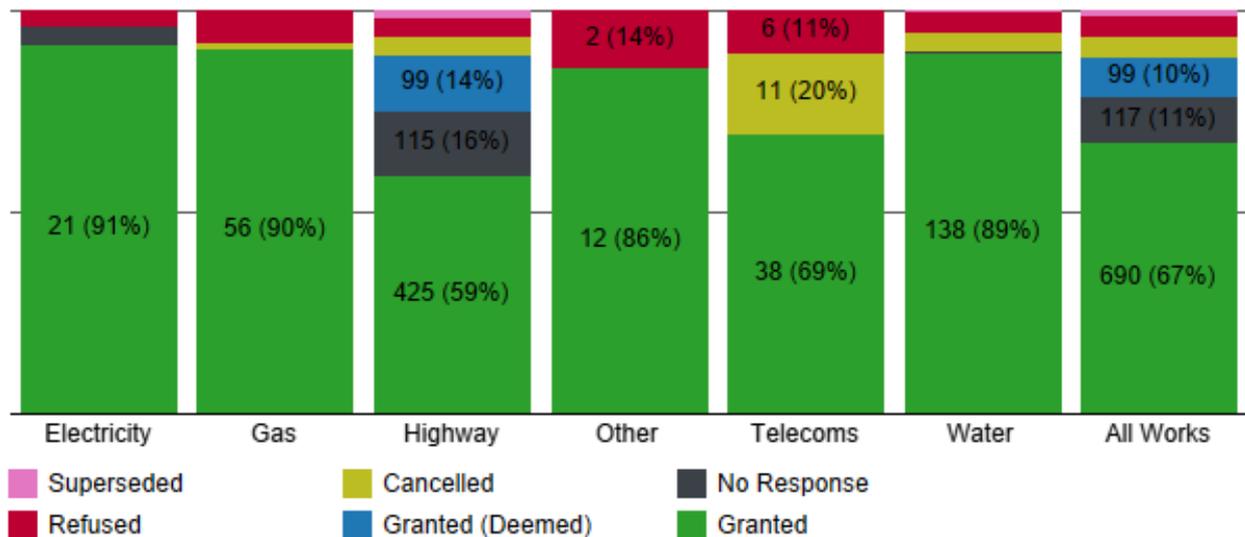
Analysis of work coordination

Responses to permit applications

For a permit scheme to be effective the Council must process and respond to each application. Where the Council accept an application, this is granted. Where the Council do not accept an application, or want to make changes to the proposed work, it is refused, and a response code (based on a set of national codesⁱⁱ) **must** be provided.

The chart and table **Responses to PAA applications by utility in year one** shows the responses (legend) to PAA applications by the Council, as a proportion of the total received, by utility in year one. The table does not show applications that are superseded or cancelled before a response by the Council.

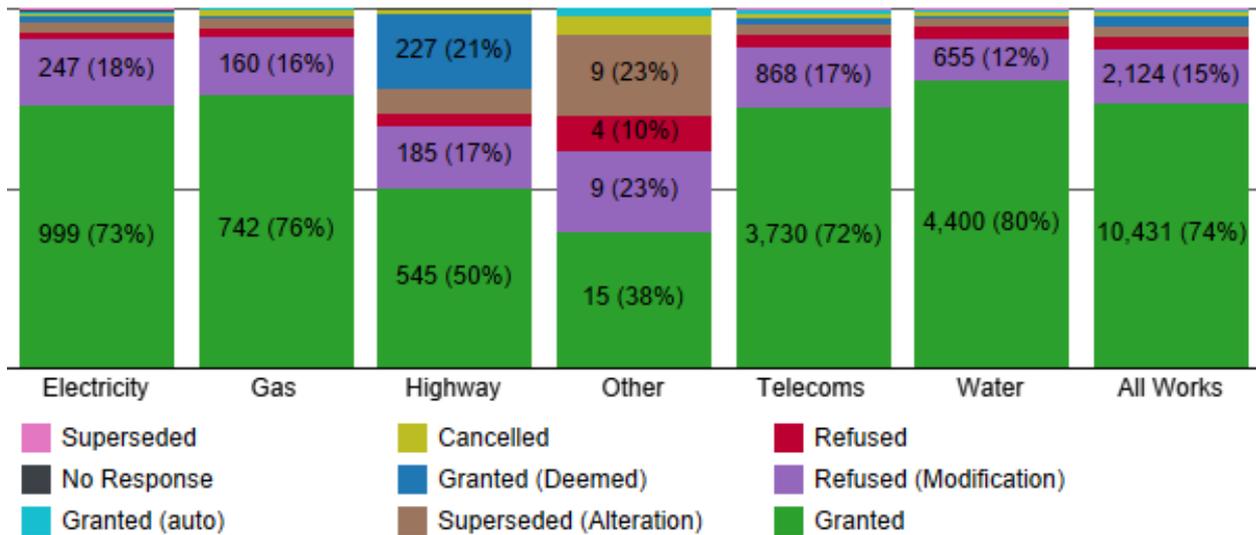
Responses to PAA applications by utility in year one



	Electricity	Gas	Highway	Other	Telecoms	Water	Total
Refused	1	5	31	2	6	8	53
Granted (Deemed)	1		214			1	216
Granted	21	56	425	12	38	138	690
% Granted	91%	92%	63%	86%	86%	94%	72%
% Granted (Deemed)	4%	0%	32%	0%	0%	1%	23%
% Refused	4%	8%	5%	14%	14%	5%	6%

The chart and table **Responses to permit applications by utility in year one** shows the responses (legend) to permit applications by the Council, as a proportion of the total received, by utility in year one. The table does not show applications that are superseded or cancelled before a response by the Council.

Responses to permit applications by utility in year one



	Electricity	Gas	Highway	Other	Telecoms	Water	Total
Refused	27	18	38	4	179	197	463
Refused (Modification)	247	157	185	12	868	655	2,124
Granted (auto)	7	7	1	1	76	44	136
Granted (Deemed)	30	7	228		91	58	414
Granted	999	742	545	15	3,728	4,400	10,429
% Granted	76%	80%	55%	47%	75%	82%	77%
% Granted (Deemed)	2%	1%	23%	0%	2%	1%	3%
% Refused	21%	19%	22%	50%	21%	16%	19%

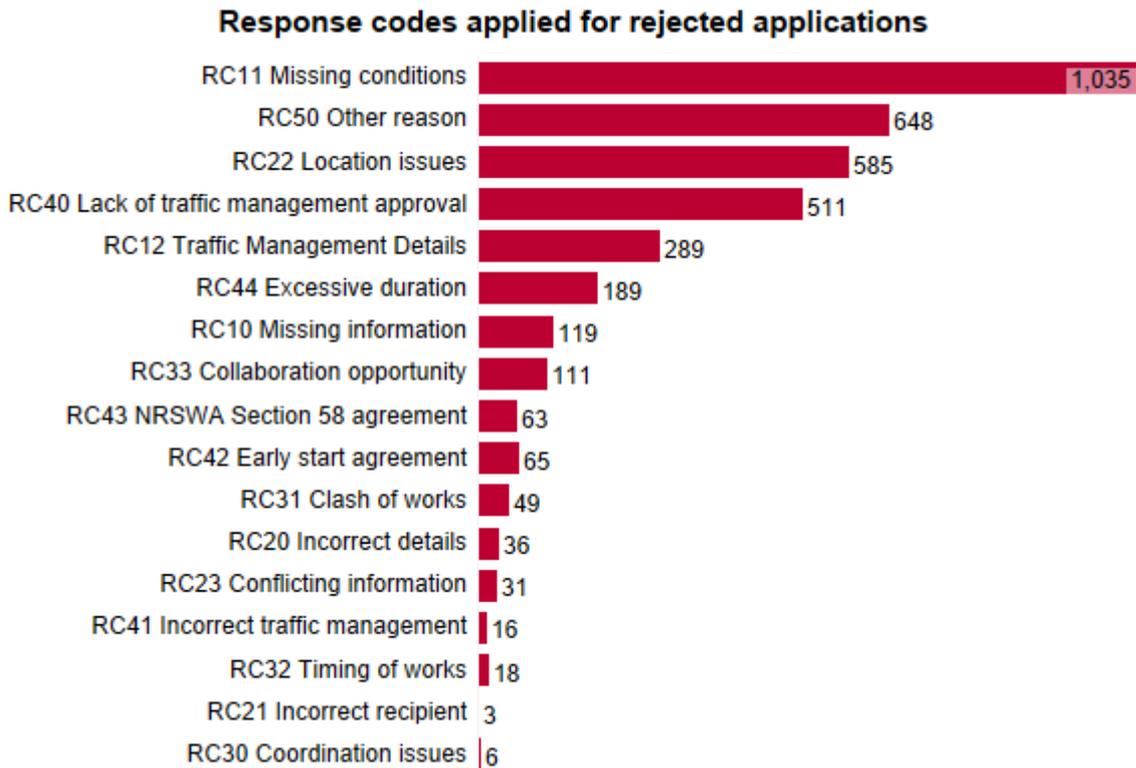
On average the Council is granting 72% of initial PAA applications. Where a PAA is unacceptable and has not been provided with the due lead time then it is rejected.

The volume of granted deemed or no response for Highways work is predominantly due to the submission of a PAA for major work for the transition to Street Manager in July 2020. These applications were not processed by the Council therefore had no response or became automatically deemed by Street Manager. The same applies to follow-up Highway permit applications.

For the initial permit applications, 77% on average are granted, with 19% being refused. This average applies to utility types with the exception of Highway and Other, demonstrating their experience in operating within a permit scheme.

For the Other utility type the lack of experience in permitting and the details required on the application, *such as permit conditions*, has resulted in high levels of rejections and permits being superseded with another application.

The chart **Response codes applied for rejected applications** shows the total number of response codes applied on rejected applications delineated by the three response types: permit modification request, permit refused and PAA refused (legend).



Analysis shows the main reasons for rejected permit applications are missing conditions, locations issues – where the coordinates do not relate to the work description – and the proposed traffic management.

The ‘other’ (RC50) reason code is the second highest code used, and further analysis shows that a more suitable code could be used instead of the ‘other’ code. The Council therefore need to review the use of response codes to ensure that this is being used correctly and systemically across the team.

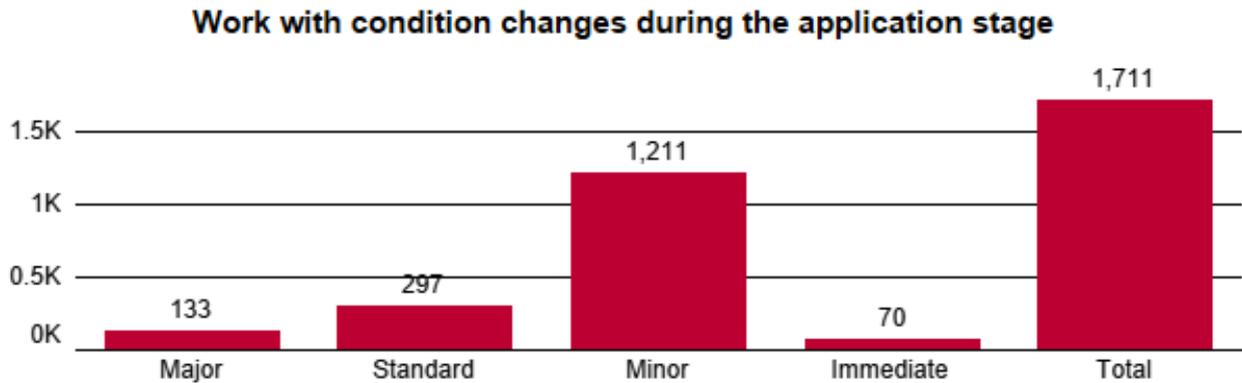
Changes applied during the life of a permit

The processing of applications provides an opportunity for the Council to undertake their network management duty, with an aim to reduce the potential disruption of the work. Analysing changes between each relevant event from initial application through to work start can therefore provide a demonstrable benefit of the permit scheme.

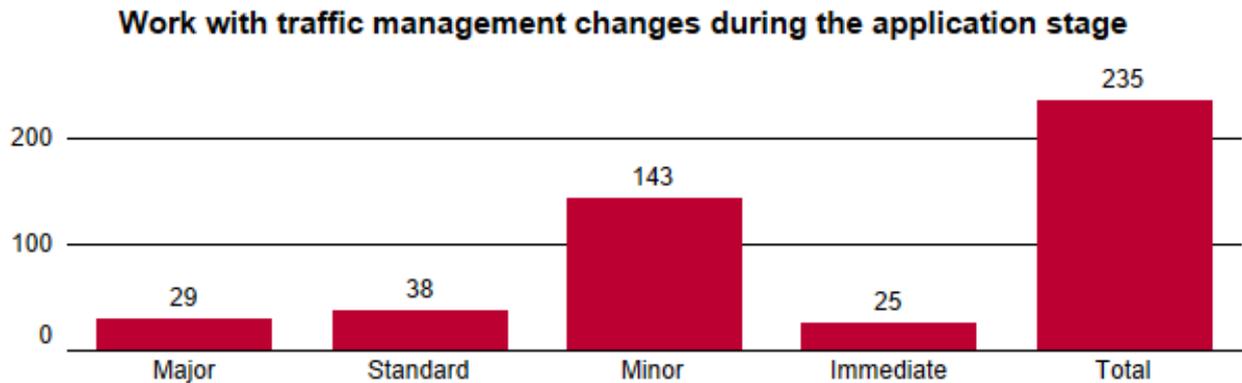
This analysis has been undertaken with consideration to the following changes in:

- permit conditions;
- traffic management; and
- duration.

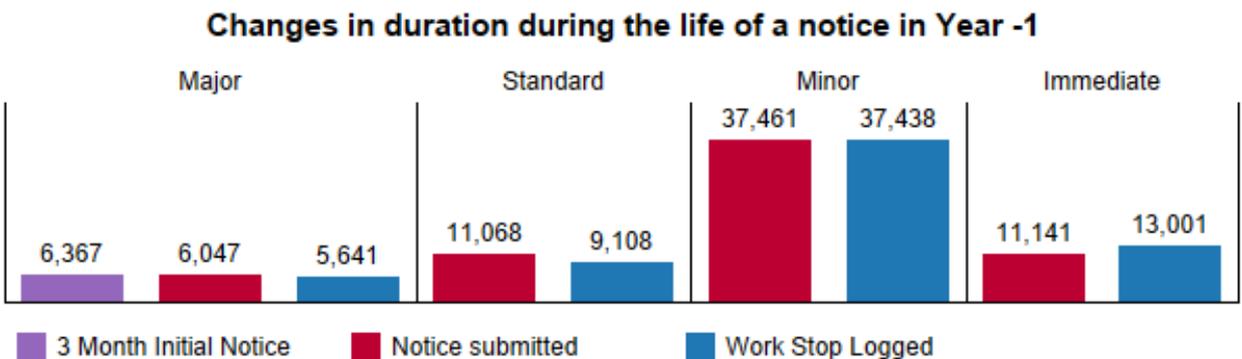
The chart **Work with condition changes during the application** stage shows the number of instances where a change was made to a permit condition during the application stage.



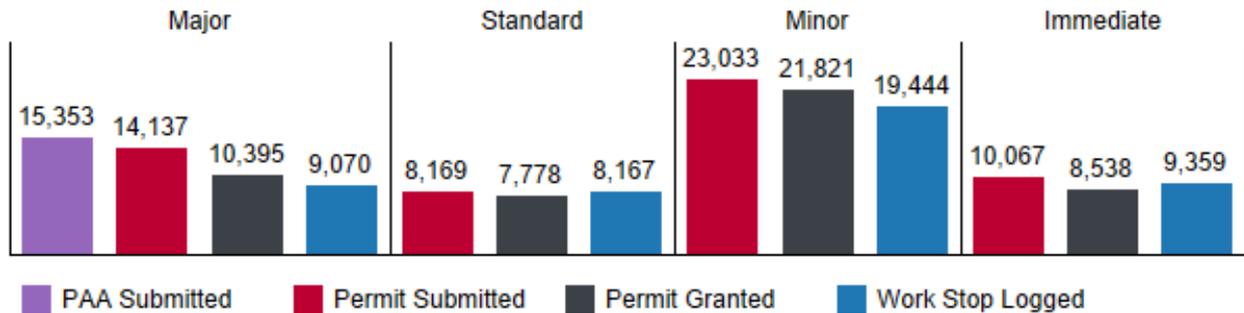
The chart **Work with traffic management changes during the application** stage shows the number of instances where a change was made to a work during the application stage.



The charts **Changes in duration during the life of a notice in Year -1** and **Changes in duration during the life of a permit in Year 1** shows the total duration of work undertaken by work category for the event types of initial permit or notice, submitted, permit granted, and work stop logged.



Changes in duration during the life of a permit in Year 1

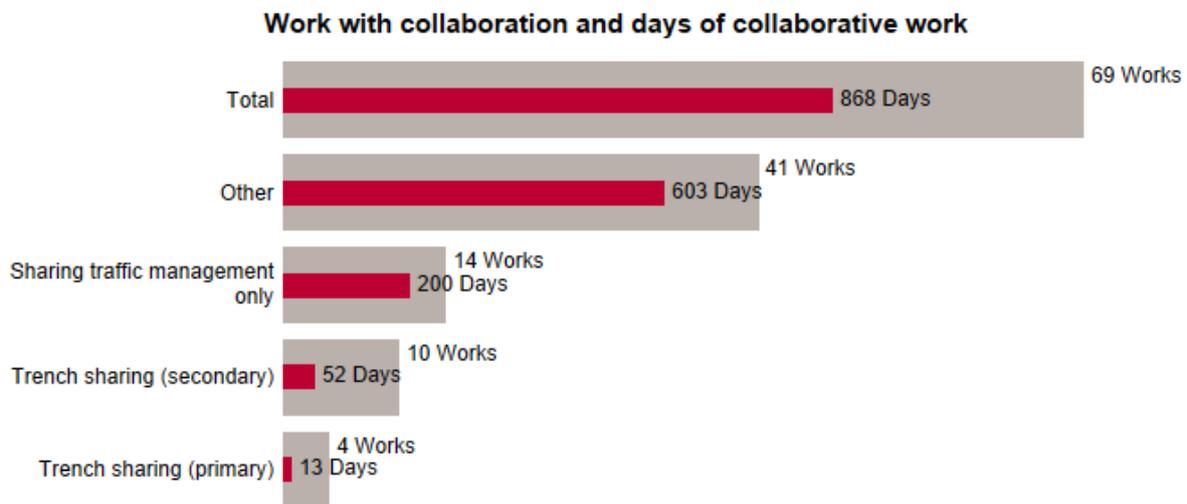


The analysis of duration during the life of a permit shows a pattern of duration reductions after the initial application at permit grant, suggesting the application process typically results in a reduced duration. In addition, comparing year one to the preceding year (-1) there is a noticeable difference in the reduction in durations.

Collaborative works

One of the most effective methods for the Council to reduce the potential disruption from works is for Promoter to collaborate their works, thereby undertaking work on the same section of the highway at the same time, concurrently or under the same form of traffic management.

The chart **Work with collaboration and days of collaborative work** shows the total number of work undertaken with a form of collaboration, by type, and the total duration of those works.



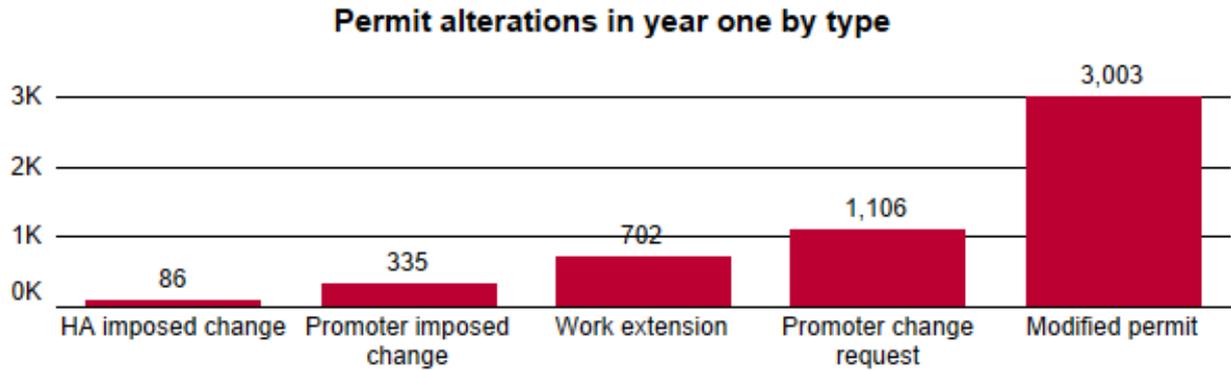
In year one 69 works were recorded with a form of collaboration, resulting in an estimated 868 calendar days of collaborative work. The total estimated impact cost of these works (using the QUADRO model calculated cost) is £384,576. It could be assumed that 50% of this impact cost has been reduced through collaboration.

Permit variation (alterations or change requests)

The permit scheme states that a *permit's content must reflect the proposed or current works and must be varied when changes are proposed to the works approved by the existing permit and no separate permit is sought to cover the proposed works.*

Therefore a permit variation, or alteration or change request as named in Street Manager, is often required and these can be issued by both the Promoter and Council (as an imposed change).

The chart **Permit alterations in year one by type** shows the number of alterations submitted by their type (as defined within Street Manager)

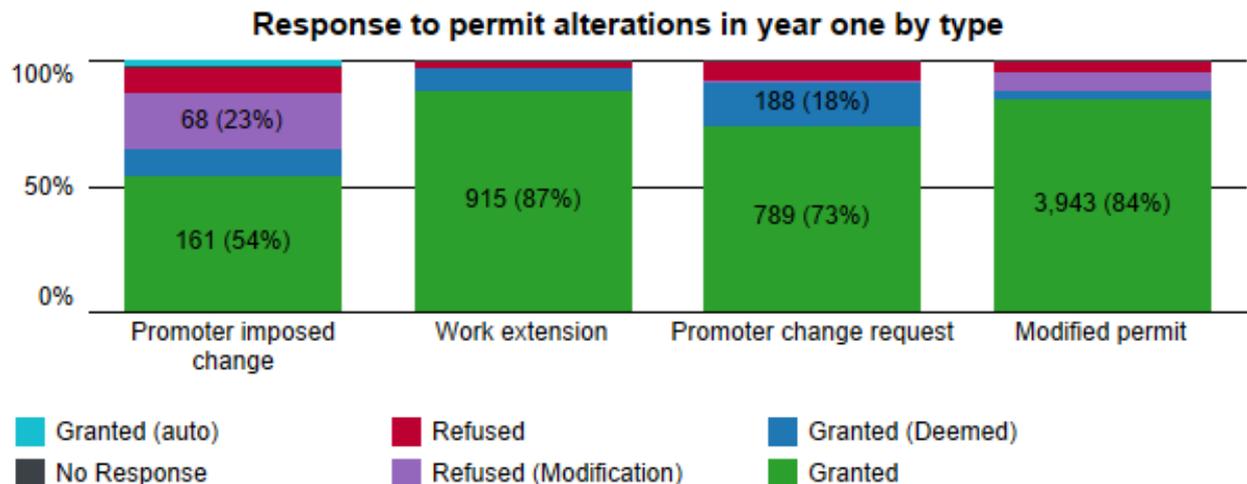


The table **Permit alterations by utility in year one** shows the number of alterations submitted by utility, including those issued by the Council (HA imposed change).

Permit alterations by utility in year one

	Electricity	Gas	Highway	Other	Telecoms	Water	Total
HA imposed change	8	9	15		17	37	86
Promoter imposed change	12	24	80	3	138	78	335
Work extension	155	111	73		65	298	702
Promoter change request	59	179	252	4	374	238	1,106
Modified permit	288	246	317	28	1,172	952	3,003
Total	522	569	737	35	1,766	1,603	5,232

The chart **Response to permit alterations in year one by type** shows the Council response (legend) to a promoter change request as a proportion of the total. Superseded or cancelled applications before a response is provided are removed from this chart.

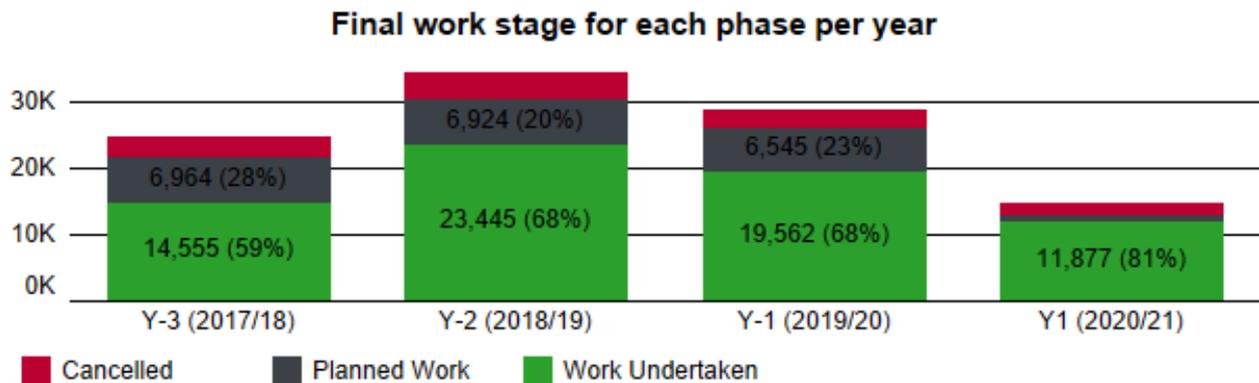


Analysis of work undertaken

Final work status

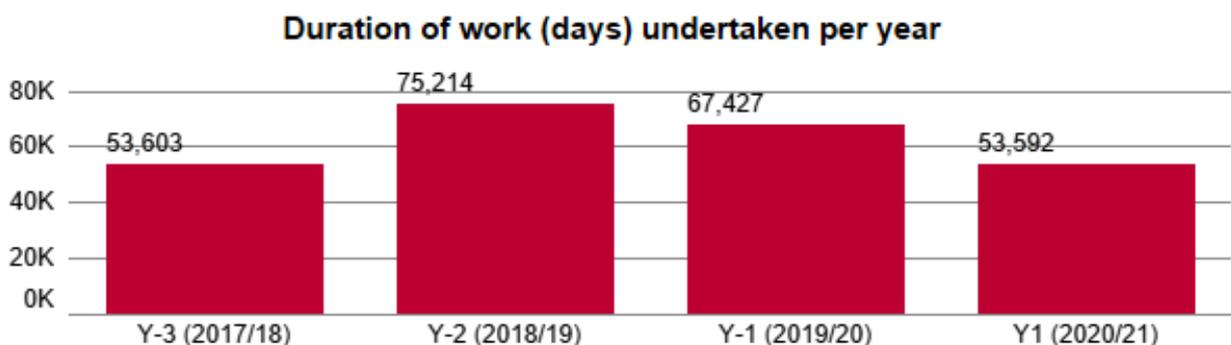
Works are only treated as ‘undertaken’ when they have reached a stage of ‘in progress’, i.e. work has actually started. Not all applications for work or where a permit has been obtained (granted) result in work undertaken.

The chart **Final work stage for each phase** shows the stage reached (legend) for each application - either planned (never started) or work undertaken (work started) – for each operational year.



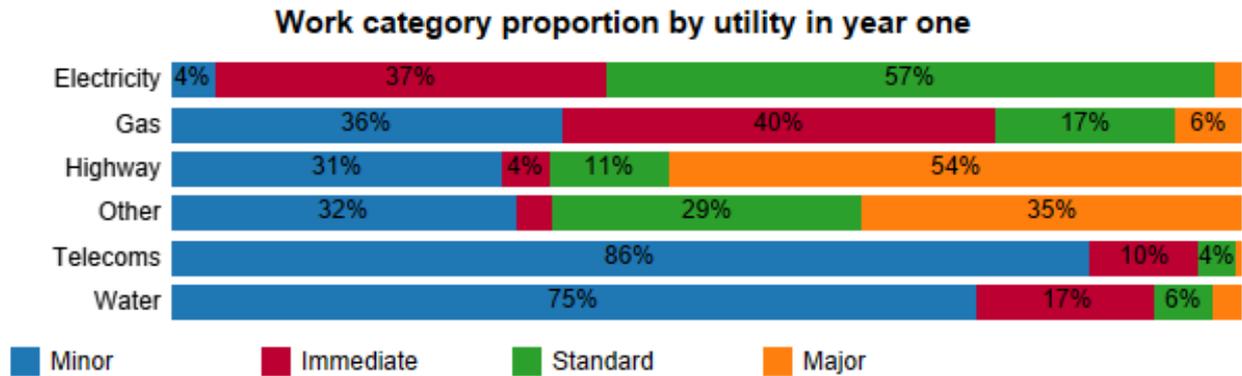
Prior to the introduction of the permit scheme 65% of applications issued to the Council resulted in work undertaken. In year one this increased to 81%. Although the Council has no control over this it is step forward for efficiency and network management. For those works cancelled or not progressing to a stage of work undertaken the total permit fees, from the processing and granting of the application, amount to £46,518.

The chart **Duration of work (days) undertaken per year** shows the volume of works undertaken by calendar days across the operational years for each utility (legend) and a proportion of the total days.



There is a noticeable decrease in the volume of work undertaken and total duration in year one, compared to previous years. This cannot be directly attributed to an overall reduction in work or reduced durations. The major influence for this decrease is the reduction of work being recorded by the Council for their own work (refer to section Analysis of work applications).

The chart **Work category proportion by utility in year one** shows the proportion of total work undertaken for each utility in year one delineated by work category (legend).



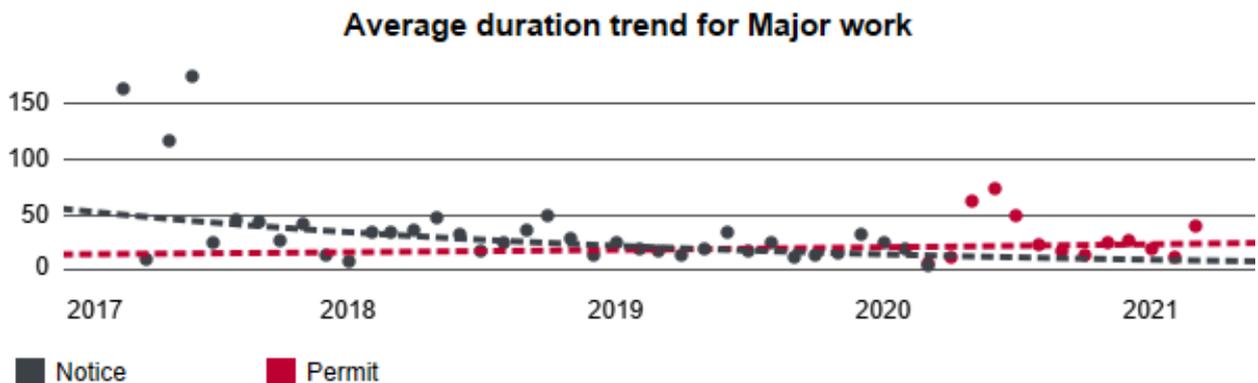
Analysis of duration over time

Analysis of duration considers trend over time, with work delineated into their work category, which is typically based on a duration banding, i.e. a minor is work within 2-3 days. Analysis of durations by works category within the next sections include charts that show **average duration**, per month with a trend line that shows a linear trend model which is computed for each average duration (observation) per month. The trend model takes into consideration the reduced number of works over the period of analysis, thereby remaining unbiased to decreasing volume of work being recorded by Highways.

Analysis of Major work

Major works are categorised as those requiring a temporary traffic regulation order, such as a road closure, or those with a planned duration of 11 days or more.

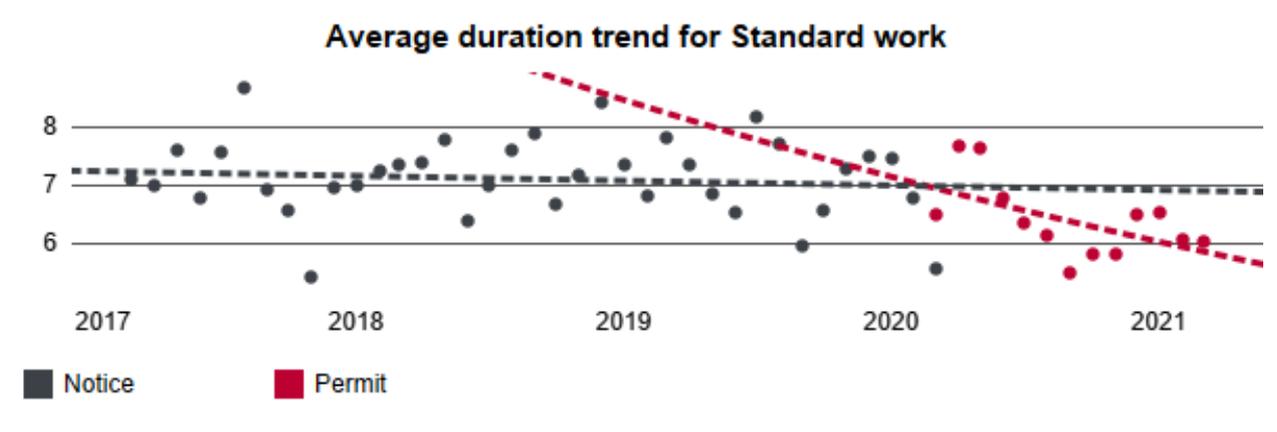
The chart **Average duration trend for Major work** shows the total duration of Major works across all operational years of analysis delineated by works undertaken through a notice or permits (legend).



Analysis of Standard work

A standard works is one with a planned duration of 4-10 days, which is neither a major work nor immediate work.

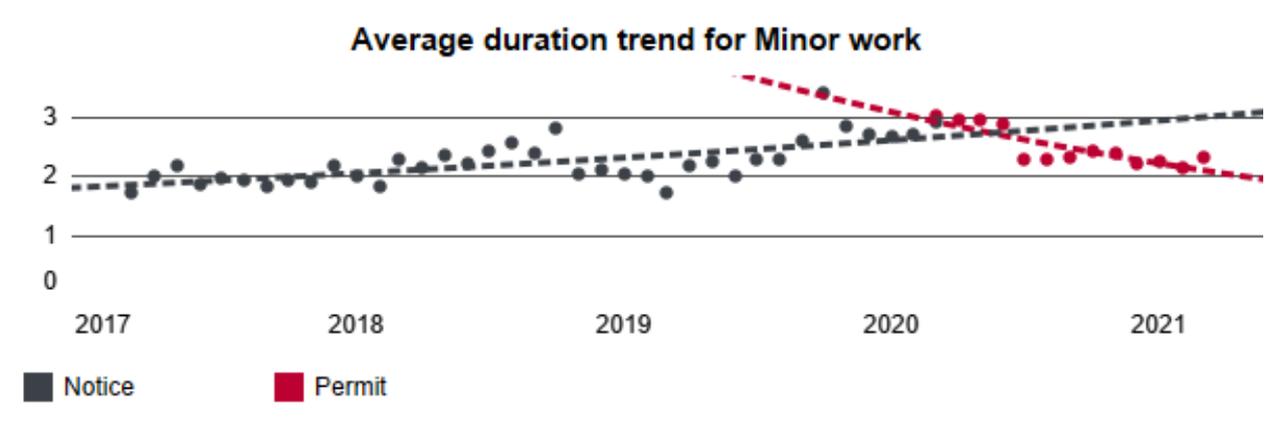
The chart **Average duration trend for Standard work** shows the total duration of Standard works across all operational years of analysis delineated by works undertaken through a notice or permits (legend).



Analysis of Minor work

Minor works are those with a planned during between 1-3 days and neither a major work nor immediate work. As shown previously in this evaluation, minor works represent the most significant proportion of works undertaken – 67% of all work undertaken in year one.

The chart **Average duration trend for Minor work** shows the total duration of Minor works across all operational years of analysis delineated by works undertaken through a notice or permits (legend).



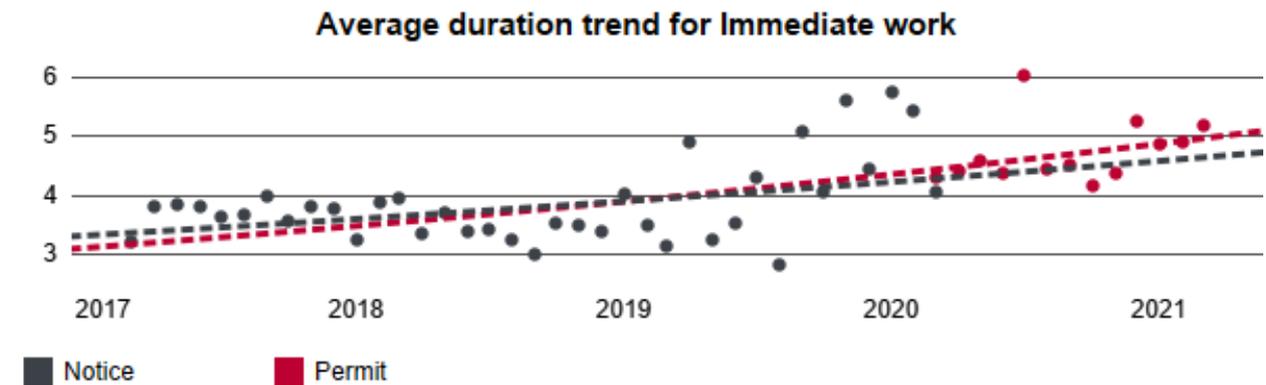
The analysis for major work shows a slight trend towards a decrease, which is not considered a concern at this stage as these works can comprise many different durations when work requires a road closure. The overall trend towards a reduction in average duration for Standard and Minor work is a positive result for year one.

Analysis over future years of operation will provide the opportunity to determine the influence the permit scheme has had to this trend. Any analysis of duration will also need to consider when work is undertaken, for example a work duration may stay at 6 hours, but if those hours are at off-peak time instead of peak times, then there is a clear benefit.

Analysis of Immediate work

Immediate works are either emergency or urgent works that require an immediate start and are therefore unplanned work. Immediate works can often create disproportionate disruption on the road network due to their unplanned nature, especially where traffic management arrangements are not reviewed and pre-agreed beforehand to reduce their impact.

The chart **Average duration trend for Immediate work** shows the total duration of emergency or urgent works across all operational years of analysis delineated by works undertaken through a notice or permits (legend).



The overall trend in average duration for Immediate work is a concern, especially as this was increasing before the scheme came into effect. The Council will focus their attention on these works, to better understand how durations are managed and controlled by Promoters and what an acceptable level for a fault find and fix should be.

In addition, more scrutiny will be placed on these works to ensure they are genuine emergency or urgent work, not short duration planned work with a required permit grant before start. Where appropriate the Council will act in such cases, which may include a fixed penalty notice for an offence.

Activity type

Since the introduction of Street Manager in July 2020 Promoters have been able to provide an activity type on their permit, identifying the type of work being undertaken, e.g. *utility repair and maintenance works or disconnection or alteration of supply*.

Of all work undertaken in year one 8,714 were issued under Street Manager with a defined activity type. Analysis of activity type is therefore based on a proportion of the total work, not the total work, however given these represent 73% of work undertaken this can be considered a suitable sample for analysis.

The table **Activity type per utility for year one (part)** shows a percentage of total for works undertaken within each activity type by utility. The colour legend is applied to denote the highest to smallest percentage for each utility.

Activity type per utility for year one (part)

	Electricity	Gas	Highway	Other	Telecoms	Water	Total
Core Sampling			1.6%				0.1%
Disconnection or alteration of supply	5.4%					0.5%	0.7%
Diversionary works	1.1%		0.8%		0.0%		0.2%
Highway improvement works			65.6%			0.4%	4.0%
Highway repair and maintenance works			19.5%	8.7%	0.0%	2.3%	2.1%
New service connection	26.6%		0.4%		0.6%	6.9%	5.7%
Optional permit (no fee)	0.4%		2.0%		0.0%	1.3%	0.7%
Permanent reinstatement	0.5%	3.2%	1.0%		0.8%	1.3%	1.2%
Remedial works	1.4%	3.1%	1.0%		3.4%	10.5%	6.0%
Statutory Infrastructure Works			4.9%		0.0%		0.3%
Utility asset works	27.1%		3.0%		10.9%	0.0%	6.6%
Utility repair and maintenance works	37.6%	93.7%			84.1%	76.8%	72.1%
Works for Rail Purposes				91.3%			0.2%
Works for road purposes			0.4%				0.0%

The table **Activity type per work category for year one (part)** shows a percentage of total for works undertaken within each activity type by work category. The colour legend is applied to denote the highest to smallest percentage for each work category.

	Major	Standard	Minor	Immediate
Core Sampling	0.2%		0.1%	
Disconnection or alteration of supply	0.4%	4.8%	0.2%	0.1%
Diversionary works	1.0%	0.6%	0.1%	
Highway improvement works	44.6%	3.5%	1.3%	1.0%
Highway repair and maintenance works	10.5%	0.5%	1.5%	2.7%
New service connection	5.5%	30.0%	2.9%	
Optional permit (no fee)		1.3%	0.6%	0.8%
Permanent reinstatement	1.2%	0.3%	1.6%	0.2%
Remedial works	1.8%	0.9%	8.5%	1.0%
Statutory Infrastructure Works		0.5%	0.4%	
Utility asset works	4.5%	23.0%	5.1%	1.8%
Utility repair and maintenance works	28.4%	34.2%	77.6%	92.4%
Works for Rail Purposes	1.8%	0.4%	0.1%	0.1%
Works for road purposes	0.2%			0.1%

The analysis of activity provides further insight into the work being undertaken on the network. Some results noted in the year one evaluation are as follows:

- 65% of highways work are for network improvement, representing 44% of all major works;
- 72% of works are for utility repair and maintenance;
- 6% of works are for utility asset works;
- 1 in 10 water utility works are for remedial defect repairs;
- 27% of electricity works are for new service connections;
- 6% of all works are for new service connections, representing 30% of all Standard works;
- 6% of all works are for remedial activities to rectify a defect;

The table **Work duration (hours) per activity type and utility for year one (part)** shows the average work duration in hours within each activity type by utility. The colour legend is applied to denote the highest to smallest percentage for each utility.

Work duration (hours) per activity type and utility for year one (part)

	Electricity	Gas	Highway	Other	Telecoms	Water
Core Sampling			19			
Disconnection or alteration of supply	98					94
Diversions works	312		23		52	
Highway improvement works			331			366
Highway repair and maintenance works			266	2	6	71
New service connection	126		197		21	79
Optional permit (no fee)	99		8		9	60
Permanent reinstatement	34	23	588		10	10
Remedial works	27	26	24		16	15
Statutory Infrastructure Works			34		7	
Utility asset works	234		176		43	52
Utility repair and maintenance works	126	163			24	61
Works for Rail Purposes				28		
Works for road purposes						

The analysis of duration for each activity type provides some interesting results, and some significant variances across Promoters, such as:

- remedial work between 15 and 27 hours;
- new service connections between 21 and 197 hours;
- works for rail purposes for 28 hours; and
- permanent reinstatement (after a temporary reinstatement) between 10 and 34 hours (excluding highways).

Using this analysis the Council can start comparing durations and activities by organisations across all works and also within sectors, which may help establish a better understanding of acceptable durations and the influences that may increase or decrease these.

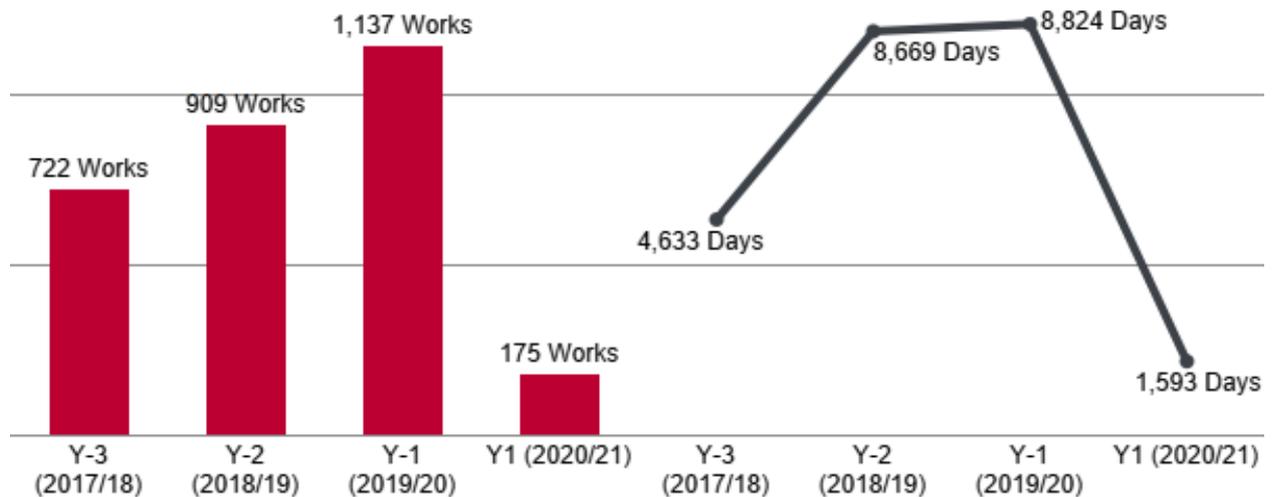
Work exceeding planned duration

Works being undertaken on a very busy and often congested road network that exceed their agreed reasonable period of duration can create significant coordination issues. In turn, these works can apply a ‘domino effect’ on work programmes and the potential need to reschedule or revoke other active or planned works that may clash with adjacent over running works.

For this evaluation a work exceeding the planned duration is identified when a work’s **planned duration** at the start of work is exceeded by the **actual duration** at the end of the work. The duration of the unplanned duration is measured in **calendar days**.

The chart **Count of work exceeding planned duration and total days of additional duration per year** shows the total number of work where the actual duration exceeds the planned duration per year (bar) and the total additional days duration (line) per operational year.

Count of work exceeding planned duration and total days of additional duration per year



The table **Work exceeding planned duration by day period per work category in year one** shows the number of overrun works for a day period, i.e. 1 day overrun, by work category in year one. The table also includes the total overrun duration in calendar days.

Work exceeding planned duration by day period per work category in year one

	Major	Standard	Minor	Immediate	Total Duration
1 Day	12	19	51	18	100
2 Days	2	8	11	2	46
3 Days	5	1	6	1	39
4 Days	1	2	2	2	28
5 to 10 Days	3	2	3	2	63
11 Days or more	10	3	9	0	1,317
Total additional days	1,020	140	386	47	1,593
Average additional days per work	31	4	5	2	

The reduction in year one of work exceeding the planned duration and the additional days of unplanned duration is positive. The most significant contributor to this duration is major works with excess duration of 11 days or more and an average additional duration of 31 days.

When the Council grant a permit, they are effectively granting a prescribed and reasonable period for the work. Section 74 of NRSWA (S74) allows the Council to **charge for occupation of the highway where works are unreasonably prolonged**. Therefore, should a work exceed this duration and become 'unreasonably prolonged' then the Council may levy a daily charge for each working day of excess. The S74 charge should be considered as a financial incentive to ensure works are undertaken to the agreed duration, without unnecessary delay.

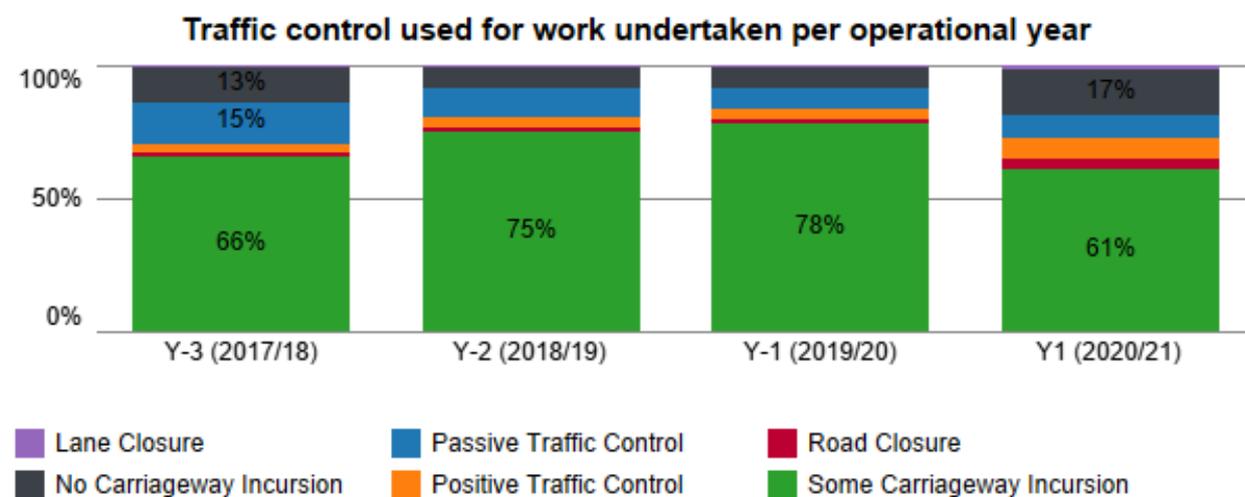
The permit scheme has allowed more scrutiny on what is happening on the network, agreeing a reasonable period and to have more accurate information of when works started and stopped to support the application of this.

Use of traffic management

All works must be undertaken using an appropriate form of traffic management (control) to ensure work is undertaken safely. The **Code of Practice: Safety at Street Works and Road Works** sets out the proper arrangements for the signing, lighting and guarding of works – this must be followed by all Promoters undertaking works on the highway.

Different forms of traffic management have varying impacts to the network, so the need to undertake works safely whilst also controlling the impact needs to be balanced carefully.

The chart **Traffic control used for work undertaken per operational year** shows traffic management deployed (legend) for all works undertaken within each operational year.



There is a noticeable change in year one traffic control with a reduction in some carriageway incursion and an increase in no carriageway incursion. With more scrutiny on planned work through the application process and challenges by the Council traffic management details are more clearly defined and any possible incursion on the carriageway, *such as a work vehicle or plant, materials or spoil*, is off the carriageway to avoid traffic impact.

Reinstatement

After work, a Promoter has a responsibility to reinstate the road to certain standards to ensure they do not shorten their life or create uneven running surfaces. A Promoter may choose to complete an interim reinstatement, also to a standard, to be made permanent within six months.

The table **Work phase reinstatement by utility in year one** shows the reinstatement type, either interim or permanent (legend), for work undertaken (when required) for each phase of work.

Work phase reinstatement by utility in year one

Reinstatement Type	Electricity	Gas	Highway	Other	Telecoms	Water	Total
No reinstatement	134	52	553	27	601	399	1,766
Interim	3	27	2		22	129	183
Permanent	1,073	768	15	4	3,554	4,514	9,928
Total reinstatements	1,076	795	17	4	3,576	4,643	10,111
% Interim Reinstatement	0.3%	3.4%	11.8%	0.0%	0.6%	2.8%	0

Analysis of permit conditions

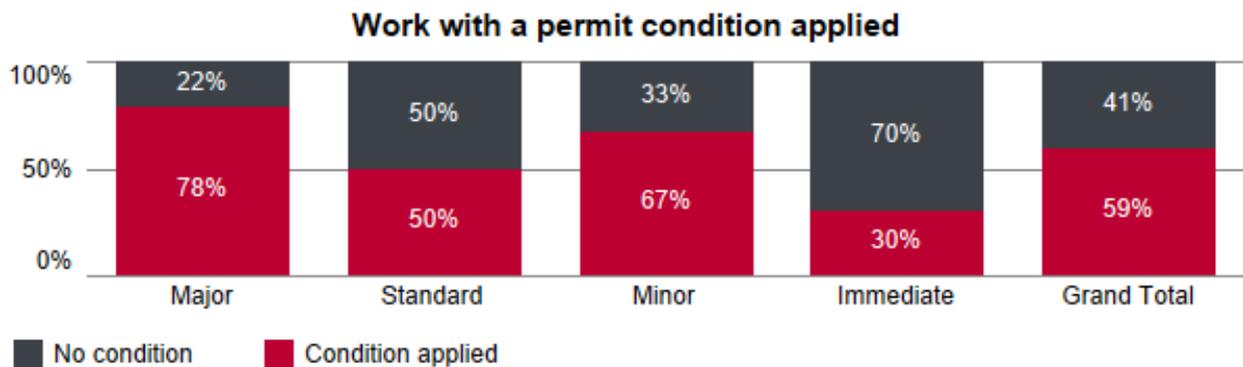
Applying a condition to a permit is one of the primary methods for achieving the objectives of a permit scheme. The process of a Promoter applying for a permit allows the Council to make changes to the work and where necessary apply conditions, within pre-define categories, to control and minimise the impact of the works, sometimes even before work starts, *for example advanced publicity of a road closure.*

The sub-sections below outline the conditions available to the Council. These are based on the categories defined in the Statutory Guidance for Permit Conditions. This Guidance sets out the conditions that can be applied to permits and the potential parameters that can be associated to these conditions.

Analysis and evaluation for the use of conditions can be difficult to undertake as there are many variables for a work that need to be taken into consideration, *such as the work methodology, location, use of materials or plant, timing of the work.*

It can be impracticable to determine the criteria for a work and whether a condition could, or should, have been applied or not. In addition, it is not always possible to determine the effect of the condition or an outcome that can be quantified.

The chart **Work with a permit condition applied** shows all work undertaken in year one and if any permit condition was applied or no condition was applied (legend) as a percentage of total work, by work category.



	Major	Standard	Minor	Immediate	All works
No condition	22%	50%	33%	70%	41%
Condition applied	78%	50%	67%	30%	59%

Overall, in year one 59% of work undertaken included a condition. Further analysis was undertaken to determine whether the conditions on a permit were included on the application, therefore predetermined by the Promoter, added during the application stage (between initial application and work start) or removed during the application stage.

The analysis shows that the majority of permit condition are applied to the permit by the Promoters in their initial application. This is to be expected as permit schemes have been in operation since 2009 and many of the Promoter working in the Bristol area already have several years of experience working under permit schemes elsewhere in the region or nationally.

It is positive however that in year one the Council have also started to apply conditions to permits, taking full advantage of this network management capability. The conditions where the Council have applied conditions, not already included on a permit, are focused on the use of temporary traffic control, which can typically have the greatest impact to the road user.

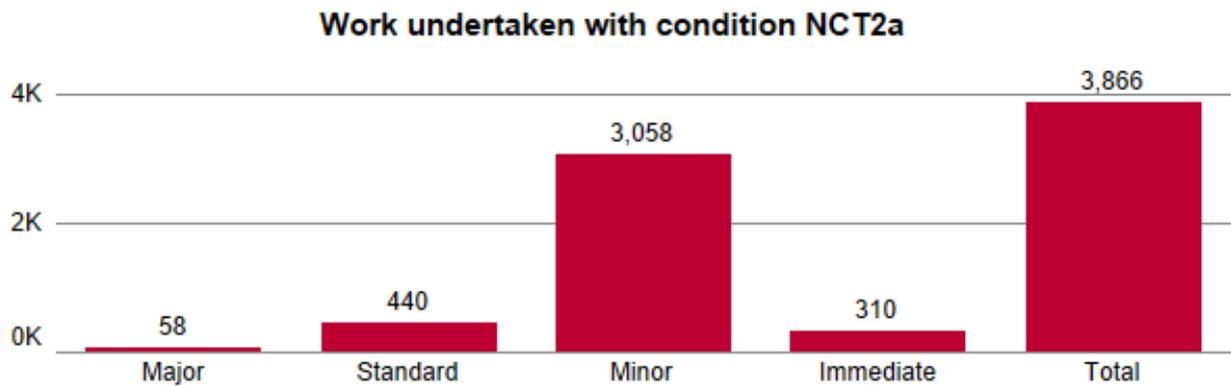
Conditions for Date & Time Constraints

There are two date constraint conditions applied to permits, NCT1a and NCT1b. These conditions limit the flexibility of when works can be started within a timeframe which varies depending on the road category. These conditions are implied and do not need to be attached to a permit, therefore no evaluation on the use of this conditions has been carried out.

There are two further time constraint conditions which can be applied to permits:

- NCT2a –to limit the days and times of day; and
- NCT2b – to specify extended working hours.

The chart **Work undertaken with condition NCT2a** shows work undertaken with condition 'NCT2a to limit the days and times of day' applied or not applied (legend) as a percentage of the total by work category.



	Major	Standard	Minor	Immediate	All works
Condition removed	2%	1%	1%	0%	1%
Condition added	4%	15%	10%	2%	9%
Condition on application	6%	15%	29%	13%	23%
Condition not applied	88%	69%	61%	85%	67%

The table **Use of condition NCT2a by work category, street reinstatement category and duration** show the works with condition NCT2a applied broken down by reinstatement category of either 0-2 and traffic sensitive or 3,4 and non-traffic-sensitive, work category, and the duration of the work. The table is colour coded to show the highest values in shades of red.

Use of condition NCT2a by work category, street reinstatement category and duration

Duration	Category 0-2 & TS				Category 3-4 & Non-TS			
	Major	Standard	Minor	Immediate	Major	Standard	Minor	Immediate
1 Day	0.1%	0.1%	22.8%	0.6%	0.2%	0.1%	6.6%	0.3%
2 Days	0.2%	0.1%	9.1%	0.6%	0.0%	0.1%	3.6%	0.2%
3 Days	0.1%	0.8%	13.9%	1.1%	0.1%	0.2%	8.5%	1.0%
4 Days or more	0.6%	7.9%	9.0%	3.1%	0.2%	2.1%	5.6%	1.1%
Total	70%				30%			

As shown in the table, condition NCT2a is predominantly used for work on the more strategic streets (category 0-2 and traffic sensitive) and for shorter duration minor works.

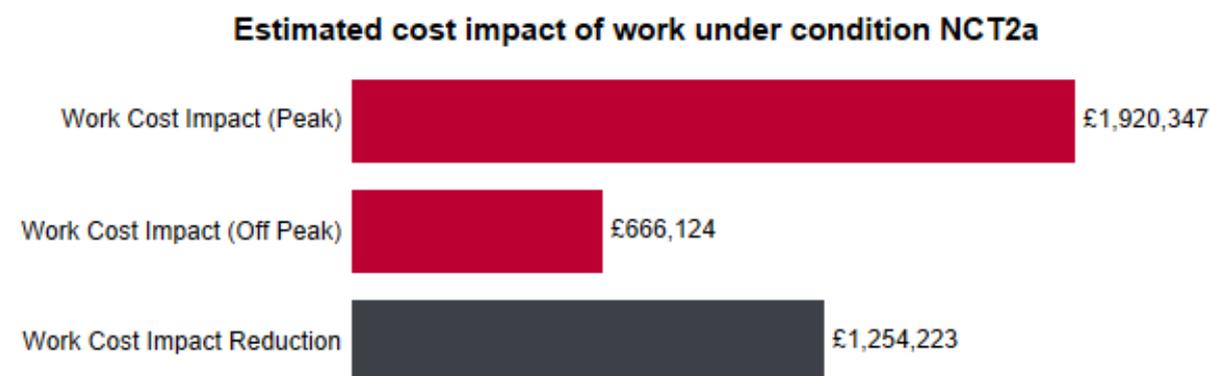
Cost impact analysis of condition NCT2a

To demonstrate a potential benefit from the application of condition NCT2a, if it is assumed that all works undertaken where this condition was applied resulted in off-peak working, *and therefore the associated traffic management was also in use off-peak*, a cost impact reduction can be determined.

The cost impact figure (£) is based on the estimated impact cost developed within the cost-benefit-analysis – it therefore represents an estimated societal impact cost from a reduction of road capacity and other associated impacts, *such as queues or diversion routes*.

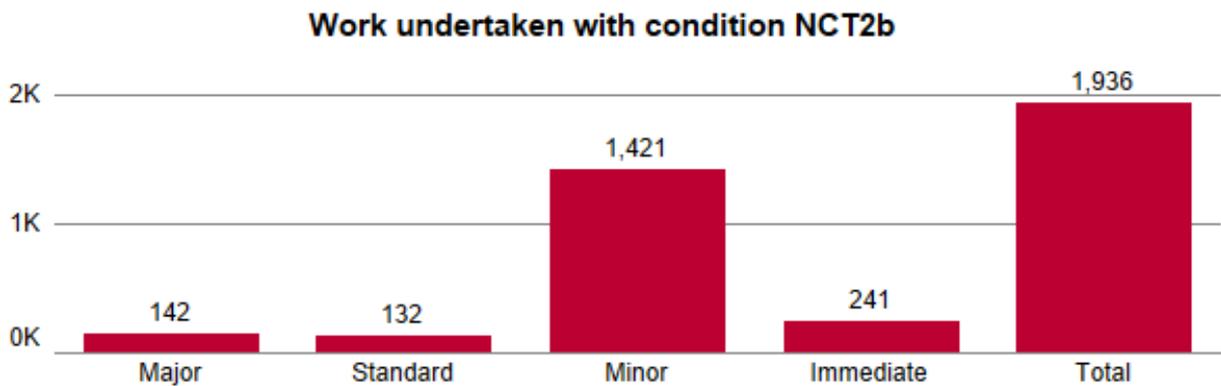
The difference between the two costs is taken as a **cost impact reduction**.

The chart **Estimated cost impact of work under condition NCT2a** shows the estimated impact cost (to society) of work undertaken in year one for work at peak times, work at off peak times, and the difference in impact cost between the peak and off-peak times where the Council has added this condition to the permit.



Under the assumption that work where condition NCT2a was applied (by the Council) during the application stage would have resulted in the work being undertaken at off-peak times instead of peak times, then a potential benefit, as a reduction of impact, of £1.25million can be assumed from the application of this condition alone.

The chart **Work undertaken with condition NCT2b** shows the number of works undertaken with condition 'NCT2b to specify extended working hours' applied by work category.



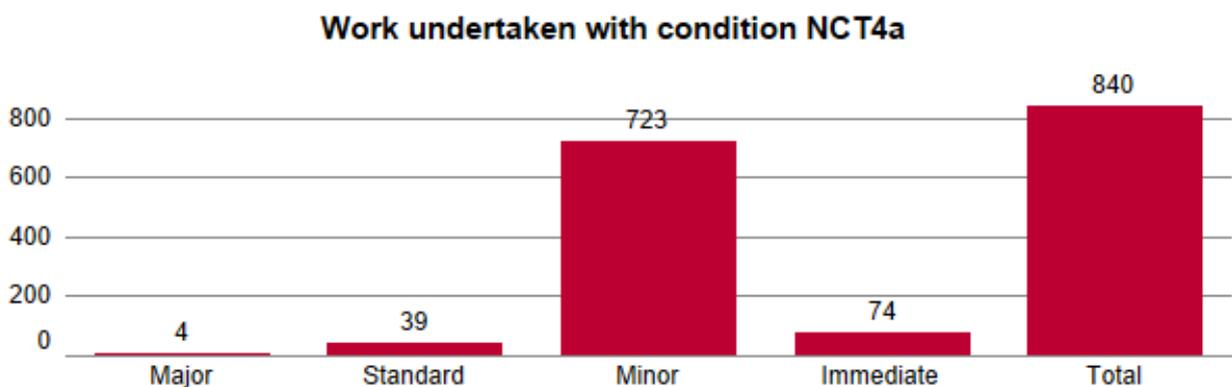
	Major	Standard	Minor	Immediate	All works
Condition removed	3%	1%	1%	0%	1%
Condition added	4%	3%	3%	1%	3%
Condition on application	20%	6%	15%	11%	13%
Condition not applied	73%	91%	81%	88%	83%

Conditions for Material and Plant Storage

There are two conditions for the removal and storage of materials and/or plant during works:

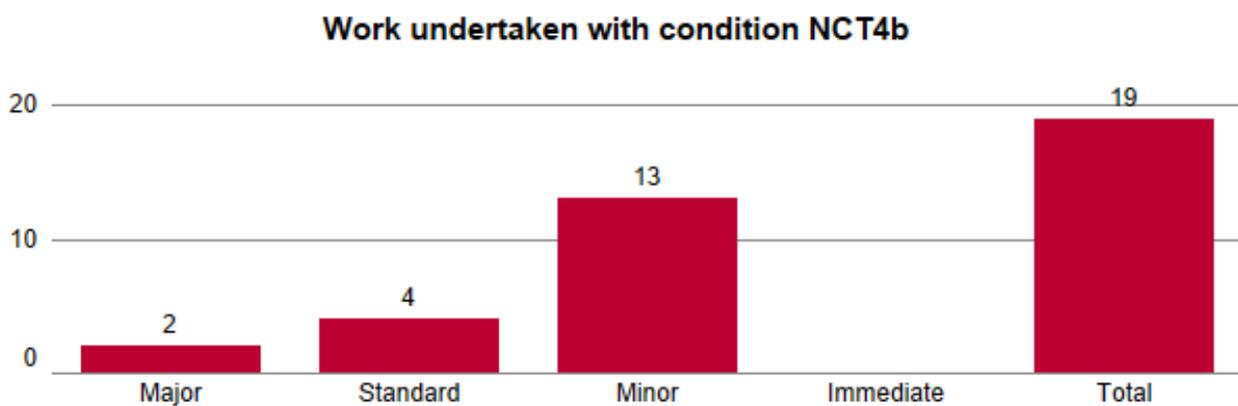
- NCT4a -removal of surplus materials and/or plant; and
- NCT4b – the storage of surplus materials and/or plant.

The chart **Work undertaken with condition NCT4a** shows the number of works undertaken with condition 'NCT4a for removal of surplus materials and/or plant' applied by work category.



	Major	Standard	Minor	Immediate	All works
Condition removed	0%	0%	0%	0%	0%
Condition added	0%	2%	2%	0%	2%
Condition on application	1%	1%	7%	3%	5%
Condition not applied	99%	97%	91%	96%	93%

The chart **Work undertaken with condition NCT4b** shows the number of works undertaken with condition 'NCT4b for storage of surplus materials and/or plant' applied by work category.



	Major	Standard	Minor	Immediate	All works
Condition removed	0%	0%	0%	0%	0%
Condition added	0%	0%	0%	0%	0%
Condition on application	0%	0%	0%	0%	0%
Condition not applied	100%	100%	100%	100%	100%

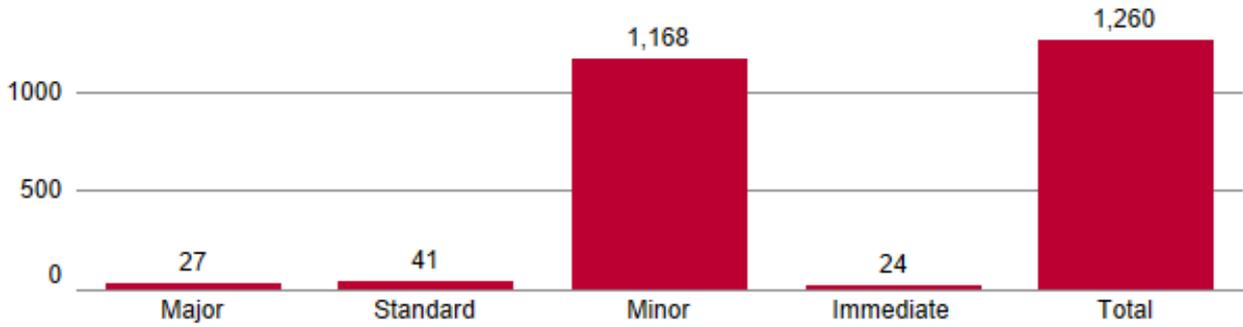
Conditions for Road Occupation

There are three conditions related to road occupation and traffic space dimension conditions, including a road closure:

- NCT5a – specifying the width and/or length of road space that can be occupied; and
- NCT6a – specifying the road space to be available to traffic (including pedestrians) at certain times of the day; and
- NCT7a – limiting activities when the specified road is closed to traffic.

The chart **Work undertaken with condition NCT5a** shows work undertaken with condition 'NCT5a specifying the width/length of road space that can be occupied' applied by work category.

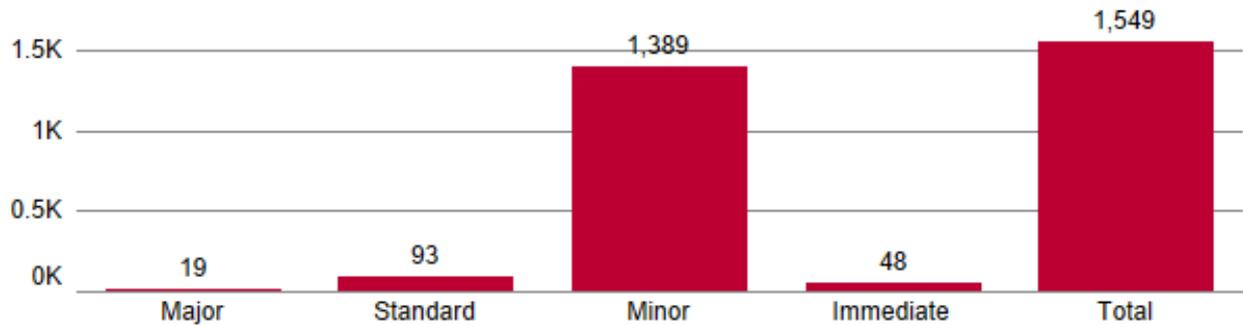
Work undertaken with condition NCT5a



	Major	Standard	Minor	Immediate	All works
Condition removed	0%	0%	0%	0%	0%
Condition added	1%	1%	2%	0%	1%
Condition on application	3%	2%	13%	1%	9%
Condition not applied	96%	97%	85%	99%	90%

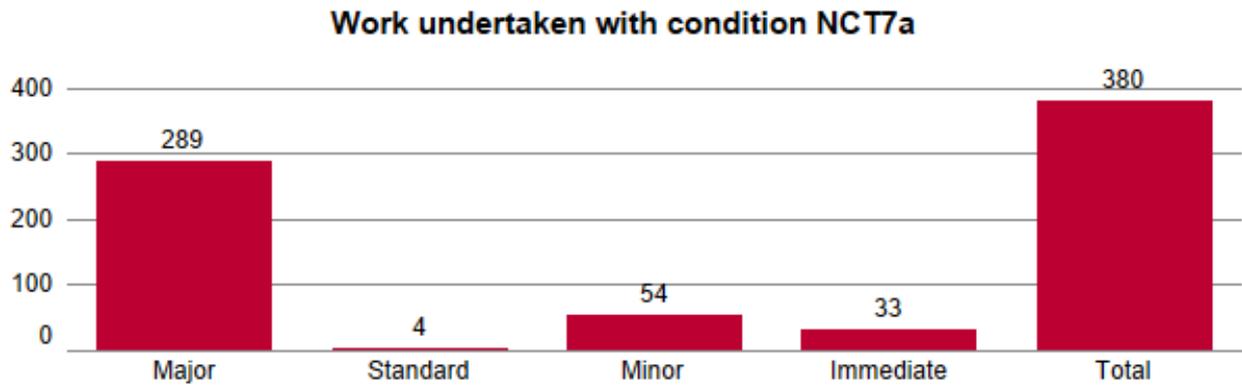
The chart **Work undertaken with condition NCT6a** shows work undertaken with condition 'NCT6a specifying the road space to be available' applied by work category.

Work undertaken with condition NCT6a



	Major	Standard	Minor	Immediate	All works
Condition removed	0%	0%	0%	0%	0%
Condition added	1%	2%	2%	0%	2%
Condition on application	2%	4%	15%	2%	11%
Condition not applied	97%	93%	82%	98%	87%

The chart **Work undertaken with condition NCT7a** shows work undertaken with condition 'NCT7a limiting activities under a road closure' applied or not applied (legend) as a percentage of the total by work category.



	Major	Standard	Minor	Immediate	All works
Condition removed	2%	0%	2%	0%	2%
Condition added	11%	50%	13%	5%	11%
Condition on application	17%	50%	10%	56%	22%
Condition not applied	70%	0%	75%	38%	65%

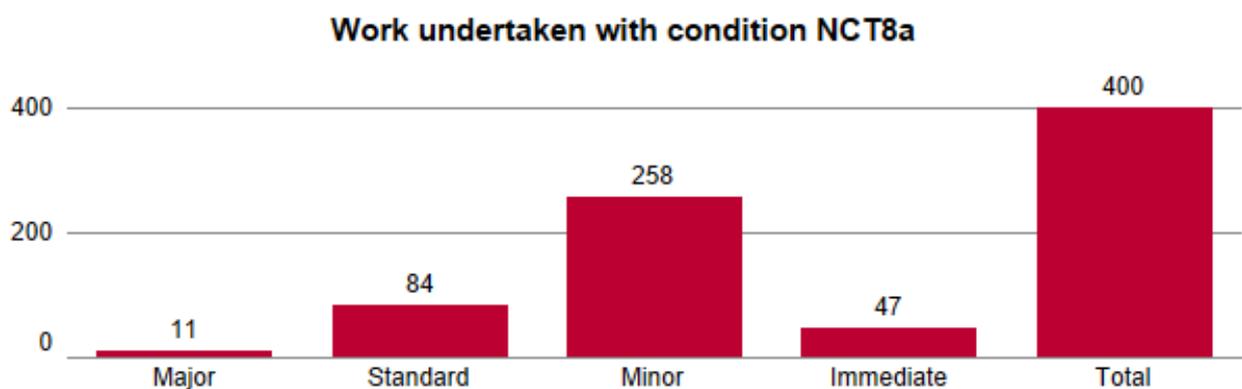
Conditions for Light Signals and Shuttle Working

There are two conditions related to works using specific forms of traffic control:

- NCT8a – limiting activities to the deployment of specified temporary traffic control; and
- NCT8b – specifying the manual control of traffic management at specified times.

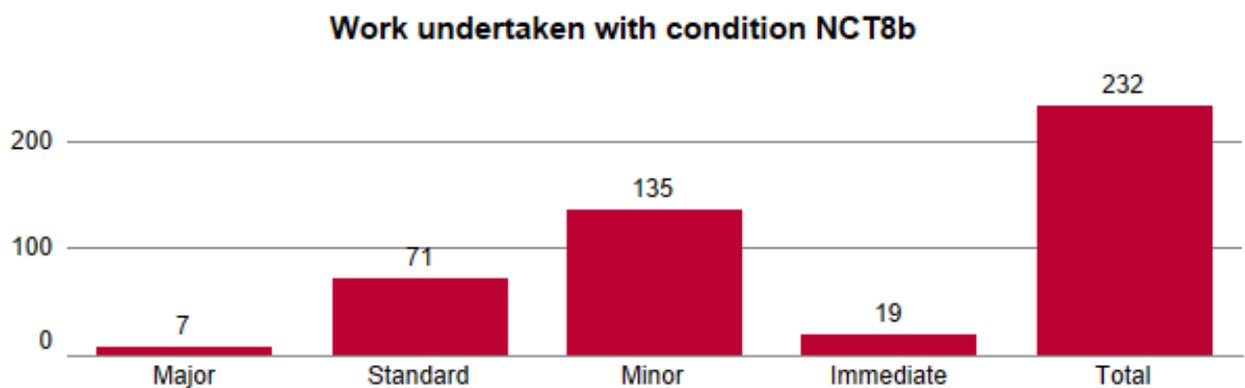
Analysis of the application of this condition is limited to works that have a relevant traffic management category, *i.e. two-way lights*.

The chart **Work undertaken with condition NCT8a** shows work undertaken using temporary traffic control with condition 'NCT8a for deployment of specified traffic control' applied by work category.



	Major	Standard	Minor	Immediate	All works
Condition removed	1%	0%	0%	0%	0%
Condition added	0%	3%	2%	0%	1%
Condition on application	3%	4%	2%	2%	2%
Condition not applied	96%	92%	96%	98%	96%

The chart **Work undertaken with condition NCT8b** shows work undertaken with a relevant form of traffic control with condition 'NCT8b for manual control of traffic management' applied by work category.



	Major	Standard	Minor	Immediate	All works
Condition removed	0%	1%	1%	0%	1%
Condition added	5%	18%	18%	3%	14%
Condition on application	6%	20%	12%	10%	12%
Condition not applied	89%	61%	69%	87%	73%

Conditions for Traffic Management Changes

There are three conditions related to traffic management changes during works:

- NCT9a – notifying the Authority when traffic management changes during works;
- NCT9b – specifying the traffic management arrangements to be in place before activities can commence; and
- NCT9c – removing portable traffic signals from operation when no longer in use.

Analysis for the use of this condition has been undertaken only on works where a traffic management type is specified and relevant to the condition, e.g. *two-way lights for NTC9c*.

The chart **Work undertaken with condition NCT9a** shows work undertaken with condition 'NCT9a to notify when traffic management changes' by work category.

Work undertaken with condition NCT9a



	Major	Standard	Minor	Immediate	All works
Condition removed	1%	0%	0%	0%	0%
Condition added	1%	0%	0%	0%	0%
Condition on application	5%	1%	0%	1%	1%
Condition not applied	94%	99%	100%	99%	99%

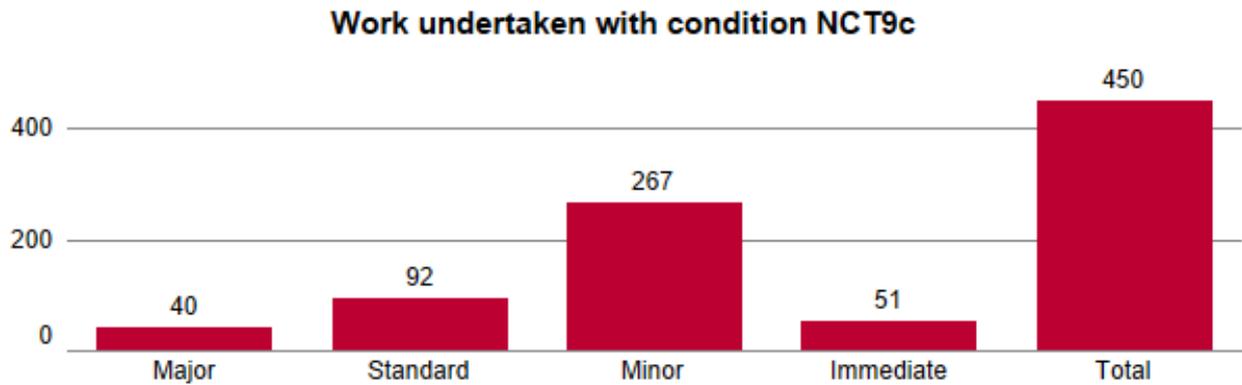
The chart **Work undertaken with condition NCT9b** shows work undertaken with condition 'NCT9b specifying the traffic management arrangements to be in place before activities can commence' applied by work category.

Work undertaken with condition NCT9b



	Major	Standard	Minor	Immediate	All works
Condition removed	0%	0%	0%	0%	0%
Condition added	2%	0%	0%	0%	0%
Condition on application	2%	0%	0%	0%	0%
Condition not applied	95%	100%	100%	100%	99%

The chart **Work undertaken with condition NCT9c** shows work undertaken using portable traffic signals only with condition 'NCT9c removing portable traffic signals after use' applied or not applied (legend) as a percentage of the total by work category.

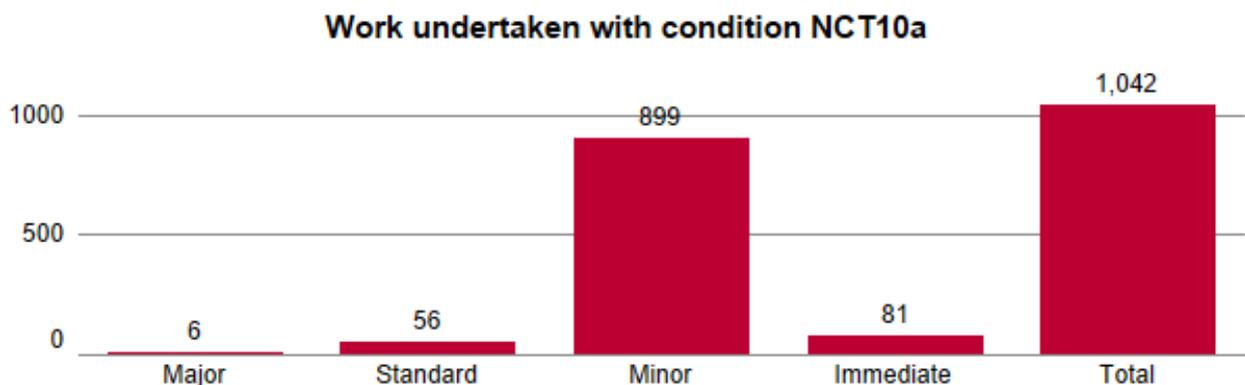


	Major	Standard	Minor	Immediate	All works
Condition removed	8%	3%	0%	0%	1%
Condition added	31%	27%	36%	9%	29%
Condition on application	25%	21%	21%	25%	22%
Condition not applied	36%	49%	43%	66%	48%

Conditions for Work Methodology

There is one condition related to work methodology: NCT10a – specifying the work methodology to be used for the proposed activities.

The chart **Work undertaken with condition NCT10a** shows work undertaken with condition 'NCT10a for work methodology' applied by work category.

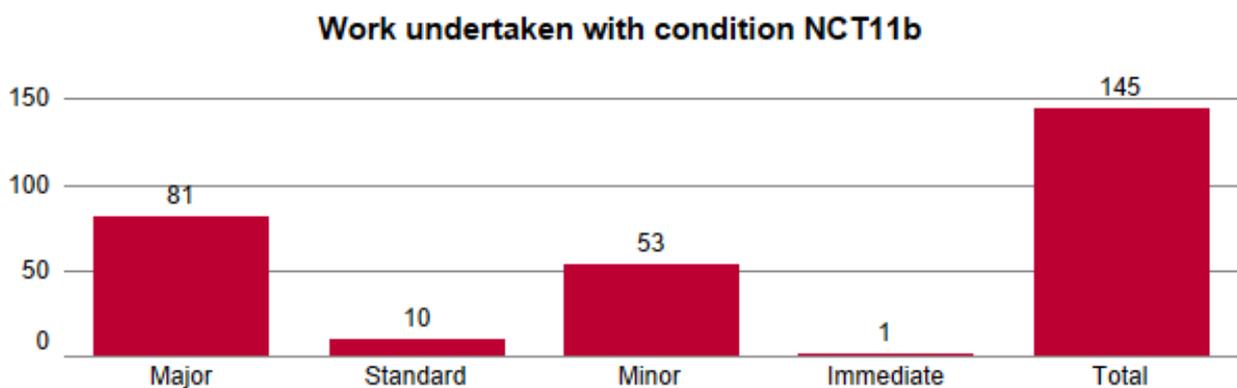


	Major	Standard	Minor	Immediate	All works
Condition removed	0%	0%	0%	0%	0%
Condition added	0%	3%	2%	0%	2%
Condition on application	1%	2%	9%	4%	7%
Condition not applied	99%	95%	89%	96%	91%

Conditions for Consultation and Publicity

Displaying a permit number on a site information board during the entire duration of the works is a condition that is implied on all permits (NCT11a) and therefore does not need to be specified within a permit. There is an additional condition (NCT11b) specifying the advanced publicity of works that can be applied to work.

The chart **Work undertaken with condition NCT11b** shows work undertaken with condition 'NCT11b for advanced publicity of works' applied by work category.



	Major	Standard	Minor	Immediate	All works
Condition removed	0%	0%	0%	0%	0%
Condition added	3%	0%	0%	0%	0%
Condition on application	12%	0%	1%	0%	1%
Condition not applied	85%	99%	99%	100%	99%

Conditions for the Environment (Noise)

There is a condition that can be applied to works for an environmental (noise) control: NCT12a – limiting the timing of certain activities for the environment. In year one this condition was applied four times on Minor works.

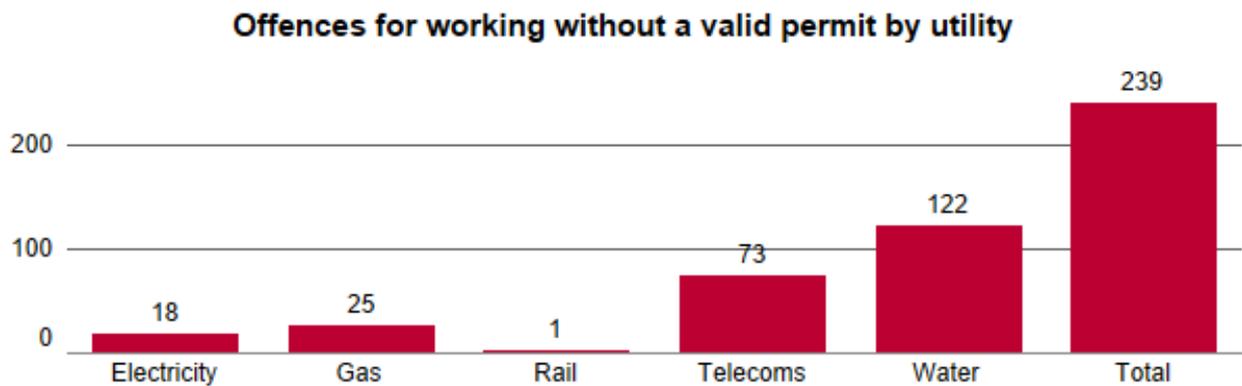
Local Conditions

Statutory Guidance allows for a non-defined condition to be agreed between the Council and a Promoter – this is called a local condition. No local conditions have been applied by the Council.

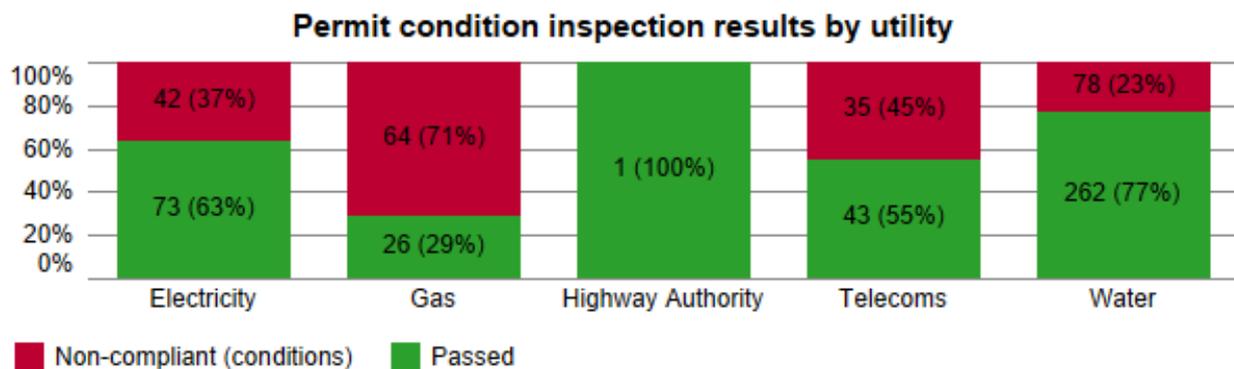
Analysis of permit compliance

Under a permit scheme the Council can undertake additional inspections during work for permit compliance to ensure that (a) work is being undertaken with a valid permit and (b) in accordance with the stated conditions (as applicable). A permit scheme introduced two new offences, with financial penalties for statutory undertakers, where there is a failure to comply with either of these.

The chart **Offences for working without a valid permit by utility** shows the number of offences issued by the Council for working without a permit by utility.

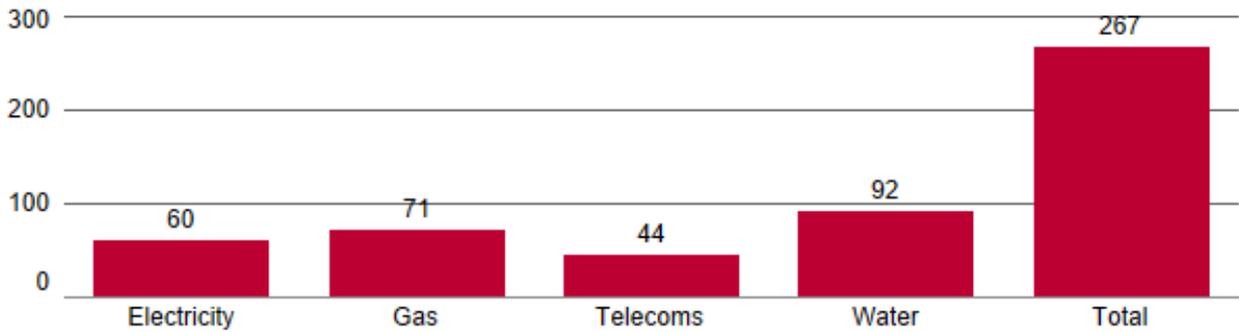


The chart **Permit condition inspection results by utility** shows the results of permit compliance inspections (for conditions) as a percentage of the total (legend). Each section contains the relevant number of passes or failures and the percentage (of total).



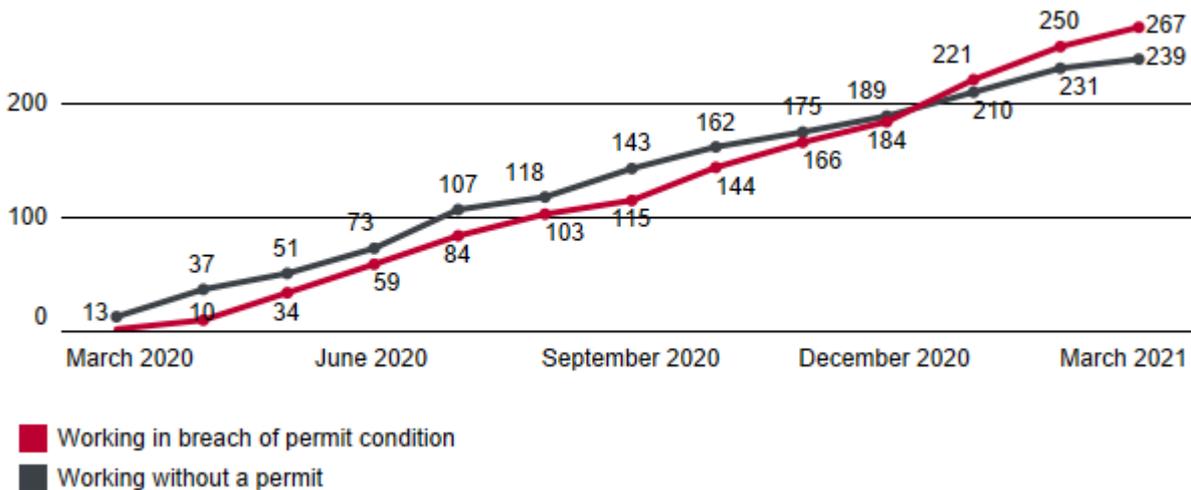
The chart **Offences for breach of permit condition by utility** shows the number of offences issued by the Council for a breach of permit condition by utility.

Offences for breach of permit condition by utility



The chart **Offences over time during year one** shows the number of offences issued by the Council for a breach of permit condition and working without a permit as a running total during year one.

Offences over time during year one



Overall, the level of compliance with the permit scheme has been good in year one, expect for any observations noted in this evaluation. As the volume of offences shows a continual trend, as opposed to a high-level at the start of the scheme the Council will need to ensure they continue checking works during their inspections (work in progress).

The offences recorded do not include Highways as they are not liable for an offence, however the Council do intend to record these to provide shadow offences for non-compliance to demonstrate parity treatment for all Promoters. .

The chart **Timing condition (NCT2a) on work undertaken in CAZ by duration (days)** shows the works undertaken in the clean air zones in year one delineated by their duration (calendar days) and whether a timing condition (NCT2a) was applied (on the application), added or removed (during the application process) or was not applied. This chart only contains work with a traffic control that would impact the carriageway excluding road closure.

Analysis of cost and benefit

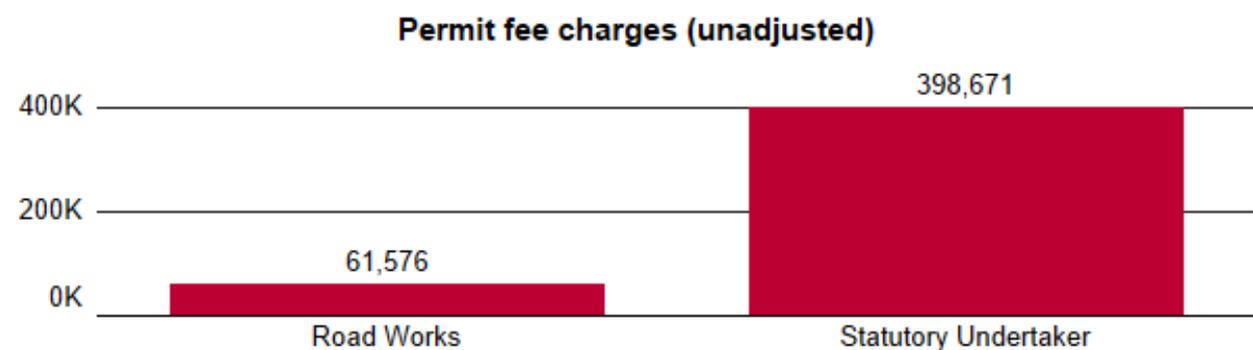
Cost for operating the scheme

The Permit Scheme Regulations allows the Council to charge a fee to recover the prescribed costs for the administration of a permit, a provisional advanced authorisation and the variation (alteration) of a permit. These fees are applied to statutory undertaker works only, not for work for road purposes (highway authority work).

The Council identifies costs to operate the permit scheme by delineating the staff and associated overheads that are directly responsible for processing statutory undertaker works, and their time spent on these tasks, over and above the resource required to run the previous noticing regime.

The table below shows the actual income, operating cost and balance (income minus operating cost) to date.

The chart **Permit fee charges (unadjusted)** shows the total fees chargeable from all granted permits, PAAs and permit variations during year one for statutory undertakers and the Highway Authority (shadow fees)



The actual invoiced permit fee income for year one was £409,862. It should be noted that this covers the period from 18th March 2020 to 31st March 2021, thereby including the full financial year April 2020 to March 2021 inclusive.

The regulations require that the Council (as a permit authority) consider whether the fee structure needs to be changed in light of any surplus or deficit, to only recover the prescribed costs. The recoverable cost for year one is £535, 000 which means the Council have incurred a deficit of £138,000.

With consideration to this deficit and the fee structure, the Council at this stage do not consider an amendment is required. Year one costs include setup cost, which are not continued into subsequent years, and the Council are considering the recruitment of additional staff to operate the scheme as per the business model. Additional years of scheme operation should allow both the permit volumes and costs to stabilise, at which point a sustained deficit or surplus can be better estimated and adjusted for.

Having established scheme benefits, these must be set against scheme costs to determine value for money – these costs include setup costs, operating costs and capital costs.

In addition to the costs of operating the permit scheme, it is important to recognise that there are costs borne by works promoters also in operating under the permit scheme. These will include the permit fees, additional administration costs in complying with the permit scheme and costs related to changes in working practices such as off-peak and weekend working.

Detailed promoter cost data has not been available, but in line with evidence gathered from other permit scheme evaluations and adopted as the default assumption in the National Permit Scheme Evaluation, an estimate of 20% of local authority operating costs relating to Statutory Undertaker works has been applied.

Scale and characteristics of works for analysis

For the purposes of the CBA works are disaggregated by type of traffic management, which has important implications on the scale of impact of those works on highway users.

The remainder of works involved no incursion into the carriageway and have been assumed to have no impact on road users. It should be noted that this is a conservative assumption as even non-carriageway works are likely to incur some impact, whether to road users or on wider society.

The estimated impact of the works with incursion into the carriageway have been modelled using the **Q**ueues **A**nd **D**elays at **R**oadworks (**QUADRO**). QUADRO was originally developed for the DfT and designed to assess and monetize the impact of delays due to works.

Having developed costs for every work type, each work within the data used for this evaluation has been assigned an impact cost, according to its characteristics and the duration of the work. The modelled impact of typical works in Bristol forms the basis of the benefits calculation.

These impact estimates include the following elements:

- Road user travel time (delay caused to consumer and business as a result of works)
- Road user vehicle operating costs (the impact of delay and diversion on vehicle operating costs for consumers and business)
- Accident costs
- Emissions costs (resulting from congested conditions and diversion)

Indirect tax revenue (increased tax revenue to the exchequer because of higher fuel consumption)

The table **Estimated work impact cost by traffic management per operational year** shows the total estimated impact cost for work undertaken for each operational year by traffic management type

Traffic Management	Permit Scheme Year			
	Y-3	Y-2	Y-1	Y1
Some Carriageway Incursion	543,088	629,513	985,106	281,750
Passive Traffic Control	601,675	587,747	342,743	292,431
Positive Traffic Control	685,124	812,853	533,826	713,367
Lane Closure	6,365,570	4,812,980	3,028,208	8,693,150
Road Closure	14,997,549	7,838,550	3,672,930	13,305,431
Grand Total	23,193,006	14,681,643	8,562,812	23,286,130

Aggregation of the modelled impacts of works occurring in Bristol defines the scale of social cost of these works.

- **Average cost impact of £474 day of work (2010 prices).**

It should be noted that work volumes vary year on year for a range of reasons, and therefore variance in roadwork impact cost should not be solely attributable to the permit scheme introduction.

Whilst QUADRO covers most of the standard monetised elements of work impact, an off-model adjustment was made to account for reliability impacts.

DfT guidance recommends that this be captured through application of an uplift to journey time costs/benefits. The recommended uplift factor is 10-20%. A factor of 15% has been adopted for this evaluation to be consistent with this recommendation.

Quantification of benefit of a permit scheme

The benefits of the permit scheme are expected to be achieved through more efficient and better managed work events taking place compared to the patterns observed before scheme implementation. Relating observed changes directly to the scheme is complicated by the range of factors which influence work occurrences.

For the CBA, the comparative scenario is one in which the permit scheme had not been implemented and is therefore by its very nature hypothetical and unobservable.

The default assumption relating to anticipated impact of a permit scheme has been to take an assumed 5% reduction in work impact in the absence of local evidence (as stated in the DfT Permit Scheme Evaluation Guidance, 2016).

The DfT's national permit scheme evaluation provided evidence of observed changes in works patterns, with the overall impact in terms of reduced works impact estimated at 5.4%. In line with this evaluation, an impact reduction of 5.4% has been adopted as the most robust source of observed evidence of impact.

Accordingly, the societal impact of works observed in the first three years of the permit scheme operation can be expected to represent 94.6% of the overall societal cost of works which would have been incurred in the absence of the permit scheme.

- **The year one permit scheme benefit is £1.26 million (2010 prices)**

The cost benefit appraisal requires that scheme benefit be appraised against scheme costs over the whole appraisal period, which in this case is recommended as being 25 years in the DFT permit scheme appraisal guidance.

Consequently, the benefits are projected forward over following years, taking an average of the three observed post-implementation years, with impacts increasing in real terms to reflect growth in values of time, vehicle operating costs, accident savings and emissions costs.

Appraisal Results

The cost benefit analysis takes the benefits and costs established from the first year of operation projects these over the 25-year appraisal period. The future cost and benefit streams are discounted using the standard discount rate of 3.5%, meaning that near term costs and benefits are valued more highly than those occurring later in the appraisal period. The results of the cost benefit analysis are:

- Net present benefits of scheme (B) £24,114,570

- Net present cost of scheme (C) £2,570,025
- Net Present Value of scheme (B-C) -£21,544,364
- Benefit to Cost Ratio (B/C) 9.38

The benefit to cost ratio (BCR) is a measure of value-for-money exhibited by a scheme.

- **With a BCR of 9.38 the permit scheme can be defined as demonstrating ‘Very High Value for Money’.**

It should be noted that with schemes generating significant revenues the BCR can become very sensitive to inputs. It should be interpreted alongside the net present value of the scheme to provide a complete picture of scheme performance. The full breakdown of the costs and benefits are shown in the **Analysis of Monetised Costs and Benefits (AMCB)** table (below). There may also be other significant costs and benefits, some of which cannot be presented in monetised form.

Analysis of Monetised Costs and Benefits

Noise		(12)
Local Air Quality		(13)
Greenhouse Gases	1,843,957	(14)
Journey Quality		(15)
Physical Activity		(16)
Accidents	1,585,711	(17)
Economic Efficiency: Consumer Users (Commuting)	8,380,697	(1a)
Economic Efficiency: Consumer Users (Other)	12,571,045	(1b)
Economic Efficiency: Business Users and Providers	2,723,402	(5)
Wider Public Finances (Indirect Taxation Revenues)	2,990,243	- (11) - sign changed from PA table, as PA table represents costs, not benefits
Present Value of Benefits (see notes) (PVB)	24,114,570	(PVB) = (12) + (13) + (14) + (15) + (16) + (17) + (1a) + (1b) + (5) - (11)
Broad Transport Budget	2,570,205	(10)
Present Value of Costs (see notes) (PVC)	2,570,205	(PVC) = (10)
OVERALL IMPACTS		
Net Present Value (NPV)	21,544,364	NPV=PVB-PVC
Benefit to Cost Ratio (BCR)	9.38	BCR=PVB/PVC

Note : This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used as the sole basis for decisions.

The principal benefits of the scheme are derived from time savings for commuters and others. There are also positive benefits related to reduced accident rates (roadwork sites tend to have higher accident rates than non-work sites) and greenhouse gas emissions savings.

The results of the cost-benefit analysis demonstrate that the impact of the scheme is found to be positive, with the benefits to road users and wider society comfortably outstripping the cost of scheme operation and promotor cost burden.

The Analysis of Monetised Costs and Benefits (AMCB) includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect.

Emissions savings

A component to the costed benefits presented above is a reduction in carbon emissions. These emissions savings are driven by more efficient vehicle movements, and the avoidance of the 'stop-start' movements associated with works.

QUADRO places a monetary value on emissions savings by applying a 'cost of carbon' to the amount of carbon generated because of works, such as additional fuel due to idling, or diversions around works or road closures.

In the most recent year of the scheme, the carbon emission generated by works within the Bristol area, as calculated within QUADRO, were valued at £1.40 million (2010 prices), which represents around 5.5% of overall work impact cost.

The implied carbon emissions attributable to works amounts to 24,422 tonnes for year one, equivalent to 6.1% of overall highway related carbon emissions (excluding motorways) produced within Bristol annually.

In line with the broader assumptions about permit scheme impacts, on the basis that emissions resulting from works are 5.4% lower than they would have been in the absence of the scheme, would lead to estimated:

- **Annual carbon emission savings of 1,456 tonnes CO₂ from reduced delays.**

To set this emission saving in context, using the typical emissions of new cars sold in the UK currently, this reduction amounts to an equivalent saving of:

- **1.22 million annual car kilometres CO₂ reduced.**

Glossary and common terms

Council	Bristol City Council including their capacity as a Local Highways Authority.
DfT	Department for Transport;
Duration of work	A works duration is calculated in calendar days based on the actual or proposed works start date and the actual or estimated works end date, inclusive of both days. Therefore, a works with an actual start date of 1st April and an actual end date of 5th April would equate to 5 days.
EToN	The Electronic Transfer of Notifications, the nationally agreed format for the transmission of information related to works between the Council and those undertaking works.
HAUC	The Highway Authorities and Utilities Committee.
LHA	Local Highway Authority.
NRSA	New Roads and Street Works Act 1991.
PAA	Provisional Advanced Authorisation, which is a notice sent only in relation for Major works 3 months in advanced of the proposed start with a higher-level of detail for the intended works.
Permit	Permission sought by a Promoter to undertake works on the highway, in accordance with the Permit Scheme.
Permit condition	<p>The capability for the Council to apply conditions to a permit, and therefore the work, is one of the primary methods to control and coordinate works through a permit scheme.</p> <p>The conditions that can be applied are set out within Statutory Guidance, <i>each with a reference code comprising NCT with a unique number</i>, within the following categories: date and time constraints; storage of materials and plant; road occupation and traffic space dimensions; use of traffic management provisions; work methodology; consultation and publicity of works; and environmental considerations for noise.</p>
Permit Scheme	The Bristol City Council Permit Scheme
Permit Scheme Regulations	The Traffic Management Permit Scheme (England) Regulations 2007, Statutory Instrument 2007 No. 3372 made on 28 November 2007 and the Traffic Management Permit Scheme (England) (Amendment) Regulations, Statutory Instrument 2015 No. 958 made on 26th March 2015.
Permit Variation	The process to change an agreed permit to reflect current or proposed changes in the works.

Promoter	A person or organisation responsible for commissioning activities [works] in streets covered by the Permit Scheme - either an Undertaker or a participating Council as a highway or traffic authority.
Statutory Guidance	The Traffic Management Act (2004) Statutory Guidance for Permits.
TMA	Traffic Management Act 2004
Undertaker	Statutory Undertaker as defined within Section 48(4) of NRSWA.
Work	Also referred to as an activity. Work that should be registered to the Council carried out by a statutory undertaker, as a street work, or for the Council, as a road work.
Works category	Every work is assigned a category, based on the following: Major works are works that are 11 days or more in duration <u>or</u> require a temporary traffic regulation order, <i>such as a road closure</i> . Standard works are non-Major works between 4-10 days. Minor works are non-Major works with a duration of 3 days or less. Immediate works are either emergency or urgent works that require an immediate start.

References

2010 is the default base year for the DfT's Webtag appraisal guidance. A common base year allows costs and benefits from different years to be compared in a common unit of account.

HUSSAIN, R.S. ... et al, 2016. Evaluating the road works and street works management permit scheme in Derby, UK. 95th Transportation Research Board Annual Meeting, 10th-14th January 2016, Washington DC

DfT Advice Note For local highway authorities developing new or varying existing permit schemes, June 2016.

ⁱ As defined in the Code of Practice for the Co-ordination of Street Works and Works for Road Purposes and Related Matters HAUC(England) Edition

ⁱⁱ As defined in the HAUC(England) Advice Note: Standard Permit Response Codes.