

**Support to UKTram Activity Group 1
Protection and Diversion of Apparatus**



Phase 2

**Guideline 1: Standard methodology for
assessing utilities' works requirements**

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Preface

UKTram is an organisation that represents the promoters and operators of tramways and light railways in the United Kingdom. It is a limited company owned in equal parts by Transport for London, the Passenger Transport Executives Group, the Confederation of Passenger Transport and the Light Rapid Transit Forum. Its main purpose is to carry out research into a variety of aspects of light railway design, construction and operation. It publishes the results in the interests of improving understanding of the factors involved in the development of light railways and uniformly raising standards throughout the industry. It is supported in its activities by the Department for Transport.

Its purposes are achieved by the establishment of Activity Groups consisting of practitioners having considerable experience in the field of interest. Twelve such groups have been established, and the subjects they cover are listed in Appendix 1. The remit of Activity Group 1 is to review the various approaches that have been adopted by promoters and operators in the UK to the task of protecting and diverting utilities' apparatus.

This Guidance Document is the first in a series of three guidelines that have been developed by Activity Group 1. These are:

Guideline 1: Standard methodology for assessing utilities' works requirements

Guideline 2: Mitigation of Utility Diversion Requirements

Guideline 3: The Causes and Control of Cost Creep and Cost Escalation

Guideline 1 is intended to inform promoters, designers and where appropriate, Concessionaires, of best practice in assessing the requirements for, and maximising confidence in the scope of utilities' diversion works at the following stages of a project:

- At initial feasibility stage
- At powers/funding stage
- At initial tender stage
- At BAFO stage
- At contract award
- During construction

1. Introduction

The construction of a tramway or light railway will inevitably result in the diversion or protection of utilities' apparatus, particularly where tracks are to be laid in highway. All aspects of a project must be valued. Before physical work on construction begins, there will be many uncertainties surrounding the project: for example, will ground conditions be as assumed in the design, or will more money have to be spent to improve bearing strengths? Will there be political changes that will contribute to an increase in costs? Will the cost of borrowing money change? A

similar level of uncertainty will apply to the presence and significance of utilities' apparatus. The risks will need to be valued in some way, and they will be valued differently by different organisations, at different stages of the project, under different funding and penalty scenarios. The quantity of diversion works may be influenced by the method of procurement adopted, and the total cost will almost certainly be dependent on it.

The cost of diverting apparatus comprises not only the basic costs incurred by the utility companies, but also the promoter's or Concessionaire's costs of supervising the works to ensure they are carried out in accordance with agreements reached with the utility companies, the costs of traffic management including the preparation of temporary Traffic Regulation Orders and possibly physical works to facilitate the diversions, and the costs of public relations. The various bodies involved in the project will assess the risks and the scope of diversions according to their interests and involvement, so the quantity of works carried out will be determined by the body taking ultimate responsibility for identifying and ordering the works, in conjunction with the utility companies.

In the case where a contractor of the promoter is involved in the works, they will incur overheads which they will seek to recover, and will also require an element of profit and, in the case of fixed price contracts, a considerable risk premium to cover unknowns. These additions will serve to increase the total cost of the works. The final costs may also be affected by the rigour of the auditing process, and the understanding of the legal background by the various parties to the diversions project. Unless the transport authority fully understands its part in the process, and is capable of meeting its obligations and enforcing its rights under NRSWA, there is a risk that they may be overcharged by the utility companies.

It is therefore appropriate to consider the alternative approaches to planning and implementing the works that might be adopted.

1.1 Methods of Procurement

The first modern light railway in the UK, the Tyne and Wear Metro, opened in 1980 and was built using the arrangement of a large number of traditional contracts, adopting designs by a variety of consultants employed directly by the Tyne and Wear Passenger Transport Executive, who then operated the system. The majority of the network runs on track formerly used as a heavy suburban railway, while vehicles run through the centres of Newcastle and Gateshead in tunnels built for the purpose. As a result, there was relatively little need for diversion of utilities' apparatus. Such diversions as were required were associated with the construction of cut-and-cover sections of the route, and the stations serving the tunnelled sections. These diversions were specified, ordered and paid for by the promoter, and supervised by the contractor carrying out the civil engineering work that affected the apparatus.

The second project of this kind, Docklands Light Railway, which opened in 1987, was designed and built by a consortium of contractors, but subsequently operated by the owners DLR (then a subsidiary of London Regional Transport). It operates entirely off-highway using old railway formations for a significant part of the route, and again there were relatively few diversions required. These were mainly associated with the

need to build structures to support the tracks. Diversions were identified, planned and supervised by the design and build contractor.

The first modern British tramway was constructed in Manchester between 1989 and 1992. It was procured through a Private Finance Initiative scheme, under a type of contract known as DBOM (design, build, operate and maintain). The alignment of the tramway through the city centre, where it runs on highway, was largely designed before the contract was let; diversion of utilities' apparatus was planned on the basis of this design work, and supervised by the promoter of the scheme, Greater Manchester PTE. Diversions began approximately a year before construction of the tramway, and continued for a further 6 to 9 months afterwards. During the period of overlap, diversions were carried out before the contractor required possession of the site, and in this way the Concessionaire was given a "clean" site to work on. There is of course always a danger with this approach that the utilities will fail to carry out their works in the agreed time, and the promoter will be unable to deliver vacant possession on time. There are other dangers associated with carrying out works in advance: in the case of Manchester, the diversions were predicated on a particular design of tram. The form of procurement was changed from a traditional contract to DBOM, and the Concessionaire opted for a different type of tram with a larger developed kinematic envelope. A consequence of this was that a few of the diversions were not moved far enough from the tracks, and had to be carried out again.

Other tramways have been built in Sheffield, Croydon, Nottingham and the West Midlands. For the latter scheme, the promoters Centro (West Midlands Passenger Transport Executive) carried out little or no preparation for diversion of apparatus, so when the contract for the construction of the tramway was let in a form similar to that used by Manchester, all planning of diversions was carried out by the Concessionaire, who also supervised the works and paid for it on completion from a fund jointly established by the promoter and Concessionaire. A similar approach was adopted for the Nottingham scheme.

For the second phase of the Manchester Metrolink, a line running from Cornbrook to Eccles via Salford Quays, GMPTE planned the diversion of apparatus, placed the orders with the utilities and paid for the work, but passed the detailed co-ordination and supervision to the Phase 2 tramway Concessionaire.

From the foregoing, it can be seen that there are several possible approaches to the control of diversion works. For a time it was generally accepted that tramways would have to be procured through a PFI-based form of contract, but other approaches are again being considered. This could range from traditional forms, where the entire design of the system is carried out by agents of the promoter, while the construction phase is let to a contractor using, for example, the ICE 7th Conditions of Contract or the NEC3 form, through design and build using the NEC3 form, to full-blown PFI vehicles where the Concessionaire is responsible for designing and building the tramway, then operating and maintaining it for a period of years.

Regardless of which form of procurement is adopted, the promoter will always have the option, at least in theory, of identifying and carrying out diversion of utilities' apparatus in advance of the main construction process. *So long as the tramway alignment is effectively determined by considerations of space and traffic*

management, so that a Concessionaire has little scope to modify it, it will normally be most cost effective to divert apparatus before sections of site are handed over for the construction of the tramway.

The main objections to this approach are that, firstly, the promoter may not have access to sufficient funds up to the point when the main contract is let due to public finance being tightly controlled during the procurement process; secondly, until a firm alignment and highway design has been prepared, there is a risk that too few or too many diversions will be carried out, and that the main contractor still needs to be involved in the process to correct the errors; and thirdly, carrying out the diversions in advance will result in the same sections of road being dug up twice, once to divert the apparatus and the second time to lay the tracks.

An illustration of the second consideration may be found in Bilston Road, Wolverhampton. The promoter of the Midland Metro scheme anticipated that the trams would run in a widened carriageway adjacent to the kerb (“gutter running”). The Concessionaire, by agreement with the highway authority, decided to place the trams in the centre of the carriageway. If the promoter had carried out diversions based on his own ideas, much of the work would have been wasted, and would have been carried out again. The third objection is generally raised by people who are unfamiliar with the process of constructing a tramway and do not appreciate that numerous visits to the same part of the route are inevitable. “Zoning” of the route is seen as the Holy Grail by new promoters at the beginning of a light rail project, in which all works in a given area are carried out continuously in one visit, making it unnecessary to trouble the frontagers again until the tramway starts operating. In practice, there will be separate visits for diversion of apparatus, track foundation construction, rail laying, introduction of overhead line, construction of stops, highway modifications, traffic signalling and road signs, as well as a variety of other miscellaneous features. One main road intersection in Manchester suffered no fewer than seven separate weekend closures so that this work could be undertaken. Attempting to contain the utilities’ works within discrete areas is impractical, and if attempted, would result in a lengthening of the overall programme and additional cost. This is because piped services generally take much longer to install than the chambers and ducts used for cabled services. Communications companies in particular would be idle for much of the project. Their cabling would frequently extend over several areas, meaning that they could not begin to install cables until work was completed in each of the areas. There is a theoretical option for them to install cables in each area individually, but this would require a great increase in the quantity of jointing work to be carried out, which is generally the most expensive part. ***New promoters should therefore resign themselves to the fact that multiple disruptions will be inevitable, and address themselves to controlling traffic management in such a way that the disruption is reduced to a manageable level.***

It is as well to point out here that work to divert utilities’ apparatus is not carried out under a contract between the utility companies concerned and either the promoter or the Concessionaire. Apparatus is placed and maintained under statutory powers granted to the undertaker, in accordance with the restrictions placed on him by the New Roads and Street Works Act 1991,¹ the Traffic Management Act 2004² and,

¹ Ch 22

where apparatus is encountered off-highway, the Town and Country Planning Act 1990.³ Consequently a Concessionaire will have no more control over the utility's programme of works than would be available to the promoter. In fact the general effect of leaving the Concessionaire to supervise the utilities' works is to lengthen the overall project programme, with the result that additional costs will be incurred. Furthermore, if no work has been carried out by the promoter to identify conflicts between the tramway works and utilities' apparatus, it will be necessary for the Concessionaire to include a large risk premium in his price for carrying out the works, due to uncertainty. ***It is therefore reasonable to say that promoters who opt to ignore issues associated with utilities' apparatus will pay considerably more for the project, and risk overestimating the benefit to cost ratio on which the viability of the scheme depends.***

It is important that the scope of the diversion works required to allow the tramway to be constructed should be thoroughly understood before a contract for the construction of the tramway is entered into. To acquire this information costs money, and involves a great deal of effort, so it is important to consider carefully how far to go at each stage of the project.

1.2 Stages of a project

Every project must go through certain stages. The body responsible for carrying out each of them will vary from one project to another. The main stages are:

- Conception and definition
- Production and assessment of initial outline business case
- Funding
- Statutory and planning powers
- Production of outline business case
- Detailed design
- Production of final business case
- Letting the contract
- Construction
- Operation and maintenance
- Decommissioning

The division of responsibilities will vary depending on the philosophy adopted by the promoter. The initial idea for a scheme will come from, or be presented to the promoter. For a tramway or light rail scheme the promoter will normally be a transport authority such as Transport for London, a Passenger Transport Authority, an Integrated Transport Authority,⁴ or a County Council. There are instances where schemes have been promoted by private organisations, but these have only been successful when they have been on a very small scale. There will be an initial stage where the viability of the scheme is assessed and compared for value for money against alternative ways of serving the same ends. Once it has been shown that the

² Ch 18

³ Ch 8

⁴ Part 5, Local Transport Act 2008

scheme is viable, the next stage in the process will be to obtain, or at least identify the source of the necessary funding. An initial outline business case will be developed that will allow an assessment of the probability of obtaining an adequate return on the capital invested, or, where the money is to come from Central Government, will demonstrate a satisfactory benefit to cost ratio, within the context of NATA, the New Approach to Appraisal.

To build and operate a tramway or other type of light railway, the promoters of the scheme will need to obtain statutory authority. This will either be a specific power for a particular scheme, or generic powers such as approvals under planning laws. This is needed, amongst other things, to protect the enterprise from claims that it is causing a nuisance, to allow land to be acquired compulsorily where it is essential to have it for the purposes of the scheme, to provide outline planning permission, and to make it lawful for the promoter to excavate in the highway to install the infrastructure that will make the scheme possible.

Since 1994, the authority for schemes of this type carried out in England and Wales has been obtained through an order granted by the Secretary of State for Transport under the Transport and Works Act 1992,⁵ while prior to this date authority was granted by a local Act of Parliament. Scotland has recently enacted its own version of the Transport and Works Act.⁶

A decision will need to be made on whether the scheme is to proceed, at least in outline. There is a considerable cost involved in seeking and obtaining statutory powers, so that there needs to be a reasonable prospect of the scheme passing the necessary financing tests to show a return on the investment, and of covering its operating costs. A prerequisite of the process of obtaining statutory powers and outline planning approval is that a significant amount of design will have been carried out, but it is unlikely that this will have been exhaustive. The first main divergence between the different methods of procurement will arise at the point of carrying out the detailed design. If the scheme follows the traditional contract route, the design will be carried out by an engineer appointed by the promoter, including the production of drawings, specifications and bills of quantities. This will be followed by a tendering process, in which the tenderer submitting the lowest price, all other things being equal, will be awarded the contract to construct the infrastructure. In general, it will not be the same organisation that operates the system when the construction is completed. The operation might be undertaken by a division of the promoter, or let as a contract to an independent organisation. Similarly the maintenance could be carried out by the builder or operator, or contracted out to another organisation. The operation and maintenance could be let out to different contractors over the lifetime of the light rail network, or remain with the same one throughout. At the end of the useful life of the system, it will normally be necessary for any infrastructure in the highway to be removed.⁷

The main alternative to this is the Private Finance Initiative, or a development of it. In this arrangement, the promoter will initiate the scheme, and obtain the necessary statutory powers. This will involve making an assessment of the viability of the

⁵ Ch 42

⁶ Transport and Works (Scotland) Act 2007 asp 8

⁷ Model clause 15

scheme to ensure that the lifetime costs of obtaining approvals, construction, operation, maintenance and decommissioning lead to an acceptable rate of return when compared to the non-user benefits of the scheme. Once the powers have been obtained, a contractor, usually known as a Concessionaire, will be appointed to find the funding for all or part of the scheme, and then design, build, operate and maintain it. The period of operation and maintenance is normally restricted to a term of years, following which a new contract for the operation will be let.

The overall form of procurement will dictate the form of contract entered into by the promoter with the contractor or Concessionaire. A traditional contract arrangement is likely to be managed using the ICE Conditions of Contract (currently the 7th Edition) or the NEC 3rd Edition Engineering and Construction Contract. The latter might equally be used for a design and build approach. For an all-in-one PFI contract (design, build, operate and maintain), the contract will be developed following the HM Treasury guidelines *Standardisation of PFI Contracts*.

A significant difference between the approaches to procurement and operation of property such as a tramway or light railway is that the PFI route allows for an element of negotiation leading up to the signing of the contract, whereas a traditional contract depends fundamentally on an offer made by the contractor, and an acceptance by the promoter, based solely on the contract documents. A PFI Concessionaire will be accepting a high degree of risk, both in the construction of the infrastructure, and in the variability of the conditions surrounding its operation. The process of tendering is necessarily more drawn out under the PFI approach, and during the final stage, known as the Best and Final Offer (BaFO) stage, the preferred bidder must carry out the process of due diligence in which all foreseeable risks are assessed. The bidders will normally seek to reduce the scope of the risks they accept at this stage: any remaining risks have to be valued, with the consequence that PFI contracts are generally more expensive than conventional contracts, where attempts are made to design out the risks before the contract is let. A BaFO stage is not appropriate in a traditional contract, as the requirements and remedies are spelt out in the tender documents, rather than having to be discovered and quantified by the potential Concessionaire.

PFI schemes are based on the premise that the client authority (the transport authority in the case of a light railway scheme) specifies only the output requirements, for example the operation of a service capable of carrying a specified number of passengers at a specified frequency between specified points. The method of achieving the desired outcome is largely left to the Concessionaire. A consequence of this is that the Concessionaire will normally be expected to manage and pay for the diversion of utilities' apparatus (subject to individual forms of contract and the promoter's approach), and absorb the consequences of any unforeseen costs or delays to his overall programme. However, this will inevitably result in a risk premium being added to the Concessionaire's price for the project, and ***promoters should consider whether handing the risks associated with diversion works to the Concessionaire represents best value for money, when many of the risks could be eliminated or reduced by planning and possibly carrying out diversion works before handing over sections of the site.*** In the case of the Croydon Tramlink scheme, for example, the utilities' diversions were extracted from the PFI scheme and transferred to the promoter as a means of reducing the costs. This thought is reflected in the *Standardisation of PFI Contracts* at paragraph 6.2.3:

“6.2.3 If the Contractor bears the risk of information being inaccurate, then its bid price may increase to reflect the level of risk assumed. The Authority should consider whether it can obtain better value for money (taking into account the overall risk allocation) if it is able to bear some of this risk itself or transfer some of this risk to a third party. If the risk is sufficiently large it will affect the ability of some or all bidders to submit bids.”

There may be a disparity between the aims or preferences of the promoter, and those of the Concessionaire, which may lead to a complication when considering the best approach to diversion of apparatus. Reliability is a sub-objective under NATA. This will have an impact on the assessment of the viability of the scheme. Nevertheless, the promoter’s main aim, if he is not going to operate the system, may well be to minimise the capital cost of providing the infrastructure for the scheme. The Concessionaire, on the other hand, will probably be penalised under the contract for failure to provide the service. The result could be that the Concessionaire will place more emphasis than the promoter on moving utilities’ apparatus to avoid interruption of service in the future. This may lead to the position where the promoter has attempted to save money on diversions (assuming he has identified them and carried them out) only to have his apparent cost savings wiped out because the Concessionaire deems it necessary to expand their scope, or include a large risk premium to counter future losses due to service interruptions. The Concessionaire may alternatively build a more expensive type of trackform as a means of avoiding future interruptions. This problem may be overcome to a degree by introducing a risk-sharing mechanism into the contract. In the case of a traditional contract, the works may be undertaken by the contractor in a manner analogous to a Prime Cost item, with the important difference that the utility companies do not operate under contract, but exercise their own statutory rights when dealing with their apparatus.

Making a decision early in the development of the scheme about which method of procurement is to be adopted will allow the promoter to tailor the approach to utilities accordingly.

2 Initial feasibility stage

2.1 Preliminary considerations

A tramway or light railway will almost inevitably find itself in conflict with apparatus belonging to utility companies. The adverse effect of tramway infrastructure on utilities’ apparatus will generally take one of four forms:

- the apparatus will be destroyed in the course of construction (for example a manhole or jointing chamber that lies within the volume that needs to be excavated);
- ground support for the apparatus will be undermined during the construction process, or the apparatus will be overloaded;
- overhead apparatus will be directly affected by the presence of trams or infrastructure; or
- access to the apparatus will be prevented or more restricted than formerly.

In each of these cases, some action will need to be taken, either to replace the apparatus in a new position where it will not be affected, or by providing some form of protection that will preserve it.

The need for diversions does not only result from the construction of the tramway infrastructure, but also from changes to the carriageway alignment, both vertically and horizontally. There will be places where the kerbline will be set back in relation to its current position, in order to accommodate the tracks. This is likely to expose shallow apparatus to additional loading, and such items will need to be diverted, protected or lowered. See Appendix 1 of the UKTram document *Summary Report: Guide to dealing with utilities and their apparatus* for further help in identifying the scope of works.

It should be understood that, until an order has been made under the Transport and Works Act 1992, and comes into force, the promoter of the scheme is not a transport authority for the purposes of the scheme. At this stage, neither section 84 of NRSWA, nor the Diversionary Works Code, apply to the scheme.

2.2 Choose route

Before any assessment of the interaction between utilities and a proposed tramway can be made, it will first be necessary to decide on an approximate route, or if appropriate, the alternative routes that might be adopted once an assessment has been made of their suitability. Eventually a firm route will need to be chosen, to run within defined limits of deviation, and this will be closely constrained by the need to provide a convincing case for the scheme at the Transport and Works Act order inquiry. Without this, any work on diversion of utilities after the order comes into force will potentially either lead to unnecessary cost and time being expended on moving apparatus that does not need to be diverted, or miss diversions that are necessary. In either case, the result is liable to be an increased construction cost.

The programme of diversions may result in traffic movement patterns being modified while the diversion work is carried out. A wide range of changes might be introduced, including road closures, one way systems, reversal or revocation of existing one way systems, introduction or lifting of parking restrictions, restrictions on straight ahead or turning movements at junctions, prohibitions on access or driving and so on. In some cases such changes can only be introduced by modifying the highway layout, particularly at junctions. This may in turn lead to diversion of apparatus exposed for the first time to highway loadings, ***at locations quite remote from the tramway.***

One of the main purposes of collecting information about utilities' apparatus at this stage will be to establish whether there is any impact on especially significant items, such as major electricity cables (rated at 33kV and above), medium to high pressure gas mains, large diameter water or sewage pipes and culverts, or major telecommunications cables. If such apparatus is affected, consideration will need to be given to whether it can be avoided by altering the route of the tramway. The cost of moving this type of apparatus may tip the balance between having a viable scheme, and one which fails to meet Government's criteria for net present value and benefit to cost ratio. Even where these can still be satisfied, the time needed simply to plan the works, because of the need to identify an opportunity to do without the apparatus in

question during the period of switchover, could conceivably introduce a delay to the project of up to two years.

The choice of alignment is the most fundamental decision in the life of a light railway scheme. The process of choosing needs to balance several conflicting requirements: above all, the alignment must satisfy the need that is to be met by the scheme, whether this is to provide a much-needed means of transport to an under-privileged area, or to seek to reduce the congestion or pollution resulting from excessive use of internal combustion engines. It is possible that the same end can be served by several alignments, or several variations on the same alignment. Knowledge of the presence and layout of utilities' apparatus along the alternative routes could have a significant impact on the cost of the various options, and may ultimately determine which ones are feasible and which are not.

Even having decided that the alignment must follow a particular route, there may be scope within a street to place the infrastructure in one part or another to avoid major obstacles, such as high capacity apparatus, substations, telephone exchanges, or pumping stations for gas, water or sewerage. In a dual carriageway, there may be a choice of placing the tracks in the inner or outer lanes or in the centre reserve.⁸ It might under exceptional circumstances be cheaper to acquire new land alongside a highway in which to place the tramway infrastructure, rather than disturb high-value apparatus.

Very often, the position of the tracks within the highway will be dictated by traffic management considerations, led by the need to retain provision for all types of traffic. In the end, however, the detail of the alignment may be dictated by political considerations. In Lyon, France, the local authority elected to save a tree at the cost of diverting an expensive set of communications cables. The tree is known locally as "the million euro tree".

Without a detailed knowledge of the position of apparatus from the earliest stages of a project, it will not be possible to weigh up the choices that may have to be made during the later detailed design stages.

2.3 Carry out survey and prepare topographical background

In order to investigate alternative routes and prepare an alignment, it will be necessary to obtain a topographical background. This might be in the form of an Ordnance Survey plan, though for purposes of accurate design, it will be necessary to carry out a bespoke survey. It is recommended that this should be prepared at an early stage of the project, and that the brief should include a requirement to record all surface indications of the presence of apparatus – manhole and chamber covers, gullies, fire and wash out hydrants, stop valves and the like.

2.4 Obtain records

Once preferred alignments have been established, it will be necessary to obtain records of utilities' apparatus that might interfere with or have an impact on the scheme. As records are received, the information they contain should be transposed

⁸ e.g. the A6102 Norton Road in Sheffield

onto the survey background, correlating them as far as possible with the surface indications recorded as noted above.

The promoter should be prepared for the possibility that they will be charged for the provision of records. Utilities are not obliged to provide records free of charge at this stage of a scheme, although most of them do when they are made aware of the nature of the scheme proposed.

2.4.1 Payment for any information (records) sought

The obligation to pay utility companies for the provision of records of their apparatus hinges on the capacity of the organisation requesting the information. Under the New Roads and Street Works Act 1991, s.79, a utility company is obliged to make its records available for inspection at any reasonable time, free of charge, to anyone having a good reason for wishing to inspect them. This would include someone having the right to excavate in the highway. However, there is no obligation to provide copies of the records, either free, or at all.

When major highway works, major bridge works or major transport works are being planned, the highway, bridge or transport authority concerned should request copies of the records. This falls within paragraph C2 of the Diversionary Works Code, which states:

"At this stage the highway authority would seek from the undertakers details of their apparatus within a specific section of the scheme which is being considered for improvement without making any commitment to the scheme. Undertakers should provide such information as they have available from records and draw attention to any likely special problems which could arise from the authority's works (see section C1.4). Information should be provided normally within 10 working days."

It is generally agreed that this information should be provided free of charge, but this is not clearly stated, either in the Code, or in the Street Works (Sharing of Costs of Works) (England) Regulations 2000.⁹ However, the judgment of the Court of Appeal in the case of *BT v Gwynedd County Council* does support this view.

The issue therefore resolves itself to the question of who is requesting the records to be provided, namely the highway authority or a potential transport authority, and whether either request would be valid at this stage.

A transport authority, for the purposes of a transport undertaking, is created when the relevant order under the Transport and Works Act 1992 comes into force. Up to this point, a utility would have the right to charge for records in accordance with rule 6 of the Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006:¹⁰

"6. Where an applicant at any time serves notice on any of those named in column (2) of the table in Schedule 5 to these Rules which is not a public authority within the meaning of regulation 2(2) of the Environmental Information Regulations 2004 that

⁹ SI 2000/3314

¹⁰ SI 2006/1466

for the purposes of the proposed application he wishes to be provided with environmental information—

(a) the recipient of the notice so served, if so requested in writing by the applicant and subject to the recipient being reimbursed the reasonable cost of so doing, shall provide to the applicant any information which the recipient has and which either the recipient or the applicant considers relevant to a screening decision (if that decision has not yet been made) or to the preparation of an environmental statement;..."

Utility companies are included among those named in Schedule 5.

It should be noted that a trolley vehicle system, for example, does not constitute a transport undertaking for the purposes of section 91 of the New Roads and Street Works Act 1991; consequently the promoter is not a transport authority for the purposes of section 84 of NRSWA, and cannot request records free of charge. In this case any necessary highway works would need to be promoted and carried out by the highway authority, which would need to make the request for records.

2.5 Prepare composite plans

The key to understanding the need for diversionary work lies in the preparation of overlay plans of the utilities' apparatus so that their positions can be compared to the proposed works. As the records are received, they should be converted to a CAD format consistent with the format adopted for the preparation of the topographical survey. In some cases it may be possible to obtain the records in a format that can be used directly or with little effort required to convert them. More often, they will be provided as paper prints, which will require some drafting effort to convert them to an electronic format.

Each type of apparatus should be formatted in such a way as to clearly distinguish it from other apparatus on the same drawing. At the very least, this will require each type to be on its own layer. Where the software permits, it can be useful to separate the apparatus of different owners into separate files, known as XRefs or external references. These can more easily be worked on in isolation, then combined into a single file, but equally can be unloaded individually so that a sub-set of utilities can be viewed in any preferred combination.

By preparing drawings in this way, it should become clear where there are conflicts between utilities' apparatus and infrastructure belonging to the tramway. The drawings should also reveal where there might be room to place diverted apparatus, which can be a major consideration in congested areas. For this reason, it is generally a good idea to obtain records of apparatus in adjacent streets, particularly ones that run parallel to the route to be followed by the tramway. Any necessary highway modifications will also give rise to the need to identify affected apparatus.

Note should be taken of any information provided concerning the depth of apparatus. However, this is not generally available from the utility companies' records other than sewer records, so will need to be acquired, where necessary, through subsequent intrusive or non-intrusive surveys. This is set out in more detail in Guideline 2: Mitigation of utility diversion requirements.

2.5.1 Understand limitations on accuracy of records

The records provided by the utility companies should not be taken at face value! There is no guarantee that they are accurate to any particular degree. As an example, BT have traditionally produced their records at a scale of 1 to 1250. This means that if a line on the plan is 1 millimetre out of position, the actual error in location on the ground will be 1.25 metres. The symbols indicating the position of manholes and chambers are several millimetres square, and generally much larger than the scale representation of the lid that will be visible on the ground. When this is added to the discrepancy between the location on the plan, and the true position on the ground, the record forms no more than a general indication of the presence of apparatus in the area.¹¹

Other utilities attempt to produce a more accurate record, and may include dimensions from the pipe or cable to prominent, traceable landmarks. Occasionally depths are also provided. When reading these it is necessary to bear in mind the possibility of changes to the environment that might affect the relationship between apparatus and physical features, for example redevelopment of buildings, alterations to the highway layout, changes in highway levels, and the construction of new roads or bridges. It is also possible that the apparatus may have been moved by a third party (for example another utility) in the course of their own work, and without the knowledge of the owner. In the case of very old records (normally relating to sewers) the change of the Ordnance Survey Datum from Liverpool to Newlyn in 1921 may need to be taken into account. A further complication lies in the possibility that some apparatus is no longer in use. This applies particularly to cables belonging to electricity distribution network operators, where frequently more than half of the cables in the ground fall into this category. Very often the live cables can only be distinguished from disconnected cables by reference to cross sections, and it is important to obtain these in conjunction with the plans. Redundant apparatus belonging to other utility companies may also be encountered.

The production of records should improve over a period of years, as utilities meet their obligation under NRSWA s.79. This requires them to record all apparatus placed underground immediately after placing it, or finding it in the course of carrying out some other operation. The requirements are set out in more detail in the Street Works (Records) (England) Regulations 2002¹², and in the Code of Practice for Recording of Underground Apparatus in the Street (which however does not have statutory sanction).

Records may be kept in the form of maps, or electronically. All records are to be related to the Ordnance Survey grid, either plotted onto a plan, or identified by co-ordinates (for example in a spreadsheet format). The accuracy of the recording is to be such that the apparatus must be measured to within 300 millimetres, and plotted to within 500mm of its true position on the ground.

There is currently no general obligation to transfer existing records into this format, so the full effects of the legislation will take some time to be apparent. Even then, the general cautions as to accuracy referred to above will still apply.

¹¹ It is understood that BT are currently working towards the production of more accurate records

¹² Street Works (Records) (Wales) Regulations 2005; Note not yet brought into force in Scotland.

Evidence of certain apparatus can be seen at the surface of the highway, for example manholes and jointing chamber covers, hydrants, stop valves and so on. It should not be assumed that the apparatus will necessarily pass directly beneath this. In fact, covers are normally set to one side of the apparatus to which it gives access to allow for a clear descent into the chamber. Stop taps are normally associated with service pipes rather than the main, while fire and washout hydrants will also be slightly off the line of the main.

For all these reasons, the receipt of the records is only the first stage in establishing the picture of what lies beneath the surface. The information needs to be refined by the use of a topographical survey which will identify features on the ground that will help in the positive location of apparatus when compared to the records. This will later be supplemented by ground probing radar and electromagnetic tracing, and finally by trial holes.

The use of surveys is considered in more detail in Guideline 2 in this series.

3 At powers/funding stage

3.1 Introduction

It is assumed for the purpose of these guidelines that the promoter will seek powers to construct, operate and maintain the tramway through the process set out in the Transport and Works Act 1992, or in the case of Scotland, the Transport and Works (Scotland) Act 2007 (both referred to here as TWA). Other mechanisms are available, such as obtaining a Provisional Order under the Private Legislation Procedure (Scotland) Act 1936,¹³ or the presentation of a Bill before the UK or Scottish Parliaments (including hybrid Bills). These are considered too specialist to be taken into account here, and will only very rarely, if ever, be encountered again in connection with a tramway.

A promoter will invariably retain a Parliamentary Agent to advise on the drafting of the order and associated documents. They will also generally appoint a consultant engineer to advise on technical aspects of the tramway, and to provide drawings of the alignment, revisions to traffic management schemes and so on. The position of the tracks within the highway, and the ultimate layout of the highway dictated by traffic management requirements and the need to accommodate the tramway will of course be fundamental to the effect of the scheme on the utilities.

The procedure for making an application for an order under either TWA is set out in the Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006 and the equivalent Scottish Rules¹⁴. This requires promoters of schemes “*affecting land in, on or over which is installed the apparatus, equipment or street furniture of a statutory undertaker*” to consult the affected undertakers¹⁵, and subsequently to serve a copy of the application and accompanying documents on

¹³ Ch 52

¹⁴ The Transport and Works (Scotland) Act 2007 (Applications and Objections Procedure) Rules 2007 (SSI 2007/570)

¹⁵ In E & W rule 10(2)(d) and Schedule 5; in S rule 8(2)(e) and Schedule 3

them¹⁶. One of the documents that are required to accompany the application is a report summarising the consultations that have been undertaken, to include an explanation in the case of any consultations that have not taken place.

Utilities often seek undertakings from the promoter, and deposit an objection to ensure that their concerns are considered, discussed and where appropriate, suitable amendments are made to the terms of the order. It is naturally better if objections can be resolved before the inquiry stage has been reached.

Ultimately it will be necessary for the promoter to decide how to respond to any outstanding objections. Firstly, are the utilities' requirements reasonable, and is it within the promoter's power to satisfy them? If not, the objections will need to be faced at inquiry. The Parliamentary Agent will be able to advise on precedents that have been set by earlier promoters placed in the same position. No promoter should give in to objectors where the objection is an attempt to change established law. An example of this was seen in the House of Lords committee stage of the Leeds Supertram Bill in 1993, when the utilities in combination attempted to override the provisions of the Street Works (Sharing of Costs of Works) Regulations 1992¹⁷ that required the utilities to absorb some of the costs of diverting their apparatus in the street. The Lords reasonably declined to allow provisions to be written into the Act that would have been in conflict with the Regulations. ***It is important for promoters to be firm in dealing with unreasonable requirements, particularly ones seeking to undermine their rights under, for example, the New Roads and Street Works Act 1991.***

3.2 Identification of affected apparatus

By now, a route will have been chosen, and the limits of the alignment will have been set to allow the scheme to be presented to an inquiry. At the earliest stage of the project, records of utilities' apparatus will have been gathered, and composite plans prepared. The time has now arrived to define criteria for the diversion of apparatus, so that the costs associated with diversion can be estimated for inclusion in the application for the order and subsequently the updated outline business case.

Section 84 (or section 143 in Scotland) requires a transport authority and a utility owning apparatus affected by the scheme, to "*identify any measures needing to be taken in relation to the apparatus in consequence of, or in order to facilitate, the execution of the authority's works...*" At this stage of the project, the promoter has not yet become a transport authority for the purposes of the scheme that is the subject of the application. Consequently he cannot depend on the utility companies to co-operate in applying this section of the Act. Nevertheless, early consultation is an important aspect of the preparation for the scheme. As it states in the Department for Transport document, *TWA Good practice tips for applicants*:

"The importance of pre-application consultations

6. Undertaking thorough and effective consultations before an application is made will almost certainly reap dividends later. The extent of consultations required will depend upon the size and nature of the scheme. But having a constructive and

¹⁶ In E & W rule 13(3) and Schedule 5; in S rule 11(3) and Schedule 3

¹⁷ Revoked by the 2000 regulations

meaningful dialogue with those likely to be interested in or affected by a project can provide helpful feedback into its design; help to allay fears and suspicions that may be based on a lack of understanding of the scheme; and can help greatly to limit the number of objections once an application is made. It is also likely to help promoters if they can secure support from key players in their area, such as local authorities, development agencies, public service providers, MPs etc. The importance of meaningful pre-application consultation is reinforced by the 2006 Rules... which require a report summarising the consultations that have been carried out, to accompany the application.”

The reference to the 2006 Rules is to rule 10(2)(d) of The Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006 which requires a record of all consultations undertaken with organisations listed in Schedules 5 and 6 to be submitted as part of the application for an order. The list of organisations includes statutory undertakers, where their apparatus may be affected by the works.¹⁸

As part of the consultation process, it will be advisable to seek to understand the likely requirements of the utility companies in dealing with their apparatus.

The promoter will need to develop his own policy in relation to diversions. This may be based on one of the following aims:

- To ensure that operation of the tramway is never halted as a result of the need for access to utilities’ apparatus; or
- To minimise the capital cost of the scheme, while accepting that there may be some future costs resulting from disruption to operations.

or may sit somewhere between these extremes.

The policy will represent the promoter’s preferred approach, but may need to be modified to satisfy the implication of section 84 of NRSWA that the measures necessary are to be established by agreement.

Life is simpler, though probably much more expensive, if the decision is taken to move everything that might interfere with tram operations at some time in the future. In practice, even this is not entirely possible, as there will inevitably be some apparatus that crosses the tracks and must continue to do so. This will normally be lowered to a depth of not less than 1.2 metres below the top of rail level. For the horizontal distance between the tramway and the nearest piece of apparatus, a minimum clearance of 1.5 metres from the developed kinematic envelope is commonly adopted.¹⁹ This needs to be considered in conjunction with section 65 of NRSWA and the associated Code of Practice, *Safety at Street Works and Road Works*. The latter sets out minimum dimensions for safety clearances between works and moving traffic: any works carried out on apparatus once the tramway is in operation should be able to observe these without affecting moving trams, and vice versa. A

¹⁸ Note that by rule 4(1), a statutory undertaker in the context of the TWA includes more than utility companies, and in particular persons authorized by enactment to carry on transport undertakings, Royal Mail, a variety of water-based activities, the British Airports Authority and the Civil Aviation Authority

¹⁹ For the definition of developed kinematic envelope, see Office of Rail Regulation publication *Railway Safety Publication 2 – Guidance on Tramways*

further factor when considering safety of work on utilities' apparatus is the presence of electrical cables overhead associated with the tramway. It must not be necessary, or possible, for plant and equipment such as ladders, to approach closer than 2.75 metres to these while they are live.²⁰

Many tramways will contain sections that run off-highway. The land occupied by the tracks will normally have been acquired compulsorily, and might contain apparatus belonging to utility companies. This needs to be identified, and accounted for at the time of making the application for the order. This will be linked to a necessary part of the process, which is the referencing of the land. In this process, a consultant is employed to establish all interests in land to be acquired, namely the names of the owners, occupiers and leaseholders. Any utilities occupying the land under a wayleave or easement will be included in this referencing process.²¹ It should be noted that the legislation governing dealings between the promoter and utility companies in occupation of land acquired compulsorily will either be a schedule to the order made under the Transport and Works Act or the Town and Country Planning Act 1990, not the New Roads and Street Works Act 1991.

If it is essential to seek to reduce the capital cost of the scheme, all conflicts between the tramway and apparatus will need to be looked at critically to assess the risks of leaving it in place.

3.2.1 Considerations of Risk

It is important to bear in mind, when considering diversions, that the company owning apparatus affected by a tramway must agree to the measures proposed by the transport authority if these will result in a significant reduction in their ability to gain swift access to it. There is little point in imagining substantial cost saving schemes if the utility's operations will be substantially prejudiced by them. Any notion of leaving apparatus in place beneath or close to the tracks must be weighed against the consequences for the general public if it should fail.

- Apparatus that crosses the track at right angles

The depth to which apparatus needs to be lowered will depend on the specific details of the tramway construction. There are many patterns of grooved tramway rail: Corus, for example, offers a standard range of 13 sections, and can make non-standard sections to order. The Austrian manufacturer, Voestalpine, carries a range of 21 standard sections. The grooved rails used to date in modern British systems have a depth of between 152 and 180 millimetres. They rest on a concrete slab, having a thickness of between 250 and 300 millimetres. Beneath this, there will normally be a layer of concrete blinding 50 millimetres thick, giving an overall depth of construction of approximately half a metre. This structure may be supported directly on an existing ground formation: on the other hand, where the existing ground is soft, it may be necessary to excavate it and replace with granular material to increase the bearing capacity.

²⁰ The figure generally incorporated into the tramway operators' codes of practice for working safely adjacent to tramways

²¹ Note that rights to take apparatus across private land will not necessarily be registered with the Land Registry

While this represents the method of construction so far adopted in this country, other forms are sometimes encountered elsewhere. For example, in Grenoble and Montpellier, France, mass concrete is used to support a conventional sleeper-based track. The depth of excavation for such a system is increased to 1 metre.

A tramway is served by a large number of cables, which will run in ducts placed close to the tracks. In Manchester City centre, for example, there are two banks of ducts, 12 on one side of the tracks and 6 on the other. These carry communications cables and power cables respectively. The larger bank of ducts is generally arranged four ducts wide by three deep. The underside of the lowest duct lies approximately 900 millimetres beneath the road surface. It is possible to alter the layout of the ducts to reduce the overall depth, but the need for the ducts must be accounted for when deciding how deep to place crossing apparatus.

If the crossing apparatus is of fairly small diameter, such as a single 100 millimetre diameter duct, with a cover to the road surface of 450 to 550 millimetres, consideration should be given to enclosing this within the track slab, specially thickened if necessary. Generally apparatus other than cables contained within a duct is likely to be too large, or too deep for this approach to be adopted. Apparatus between 550 millimetres and 1 metre deep is likely to interfere with the tramway's own infrastructure, and will consequently need to be adjusted.

- Apparatus that runs along the tracks

In the context of a street tramway, most apparatus will have been laid generally along the street and consequently parallel to the tramway. The trackslab construction forms a substantial barrier inhibiting access to any apparatus that lies directly beneath it. If apparatus is left in this position, and subsequently requires maintenance, access will only be possible through suspension of tram services and destruction of part of the tramway. Apparatus slightly to one side of the trackslab but close to it may only be worked on with tram services suspended, or during non-operational hours (normally the early hours of the morning).

There are two questions that need to be answered in relation to such apparatus: can it be left where it is? and should it be left where it is?

The utility company will itself have a view – and it might be a very strong one – on the first of these questions. If the answer is yes, the promoter will need to decide whether the benefits of doing so outweigh the risks.

The main considerations when deciding whether or not to move apparatus might be broken down into four main headings: safety; importance; maintenance and network expansion; and compensation resulting from working close to the tramway. These are considered separately below.

Safety

Piped services are liable to fail through their joints, and the consequences may be catastrophic. The failure of a gas pipe directly beneath a track slab may result in the build up of gas to dangerous levels. Combined with the potential for sparking from the rails or overhead contact wires, leaving a large or highly pressurised pipe beneath

the tracks could ultimately lead to a gas explosion. Such a risk to public safety cannot be considered acceptable.

A failed water main may lead to erosion of ground support beneath the tracks, resulting in collapse of the slab. In Manchester during the 1980s, a sewer failed and slowly absorbed the ground above it. This eventually led to a water main above it collapsing. Between the two, a large cavity was created beneath the highway surface, which was large enough to accommodate a large part of a double decker bus. Once again, the risk of a leak remaining undetected means that very careful consideration should be given before deciding to leave a water pipe or sewer beneath the tracks.

A contrary consideration is that apparatus left beneath the tracks cannot easily be damaged by other utility companies undertaking street works, and may therefore be less likely to be damaged than otherwise.

Importance

The greater the capacity of the apparatus, the more important it is likely to be in the network of the utility company. This means that it will be essential to be able to get access to it immediately to maintain supplies to perhaps thousands of people. There are also some supplies that have special importance to certain customers. Examples are hospitals and old peoples' homes, where heating and lighting are particularly important, or police and fire stations where maintaining telecommunications may be considered the greatest necessity.

Maintenance and network expansion

From time to time a utility company will need to maintain its apparatus. It may also have to expand it to provide a service to a new development. In both cases, as well as for purposes of repairing failed apparatus, there will be a need to apply tools to pipes and cables. The size of pipe-cutting equipment will be related to the size of the pipe to be cut, and a trench will need to be excavated of sufficient size to accommodate the equipment. Generally the trench will have a width at least three times the diameter of the pipe being worked on.

When high voltage electrical cables have to be jointed, the equipment employed is also bulky. For the largest underground cables at 275kV, the trench needed to accommodate the joints may be 2.5 to 3 metres wide by 15 to 20 metres long. It can be seen that there would be a considerable risk involved in leaving such large apparatus beneath the tracks, quite apart from considerations of safety. Provision was made for dealing with such cables in Leeds and Glasgow (both schemes which were abandoned, due to lack of political support).

During the life of the tramway, it is likely that some buildings will be demolished and replaced, or existing buildings will be reconfigured, for example from office use to multiple dwellings. This may lead to a rearrangement of feeds from the main pipes and cables. If they have remained beneath the tracks, this can only be achieved by halting services and demolishing the trackslab. This problem can potentially be overcome by installing a spur from the main to a position clear of the tracks that will in future be used to make additional connections. Alternatively a single pipe system can be split into duplicate networks with minimal crossing points of the tracks. This will however increase pressure on the available space.

Ducted services, normally power and communications cables, may be left beneath the tracks, if they are deep enough to survive the construction process, and access to them can be gained through manholes or chambers that are clear of the influence of the tramway.

The tramway may cross beneath items of apparatus suspended overhead. These will generally either be electric or communications cables, although other less obvious features, such as permanent supports for Christmas lights, will also need to be taken into account. In addition to the possibility of a direct physical conflict between crossing cables, there is also a potential danger to people working on one set of cables from the presence of other live cables nearby.

It may be possible to leave an expensive piece of apparatus in place beneath a tramway track if tram services can be halted in the event that it needs to be repaired. It might be possible to maintain a reduced standard of service by installing permanent crossovers at each end of the likely extent of any work of this nature, and running tram services on a single track while the repair is carried out. This is possible if the area of working can be defined in advance of the tramway being constructed. However, this may not be practicable if there are several areas where work may need to be carried out. It is expensive to provide permanent emergency crossovers, and they need to be maintained throughout the life of the tramway, with no guarantee that they will ever be used.

Practise on some continental tramways is to make use of temporary crossovers, which can be installed on suitable sections of track to provide a way round an obstruction or excavation. These are specially made sections that slot into the groove in the permanent rail, gradually lifting the trams a few centimetres above street level and lowering them again onto the opposite track. Their use has not so far been accepted in this country, at least for trams that are occupied by passengers.²²

Even if the use of temporary turnouts were an option, they present several problems that would need to be resolved in any circumstances where they were used. An obvious one is that they present an obstacle to other traffic using the highway where they are installed. Also, in a street normally carrying two way traffic, half the trams will run counter to the normal traffic flow, and special traffic measures will be required, including use of appropriate traffic signals.

Compensation and working close to tramway

Assuming the promoter and the utility company can agree to leave apparatus beneath the tracks, or so close that getting access to it is likely to result in tramway operations being halted, it will then be up to the promoter to assess the probability of access being needed and the costs of delay and disruption that will result. This will have to be compared to the cost of diverting the apparatus at the outset.

This raises the immediate difficulty that there are very few statistics concerned with failure rates of apparatus that will allow a sensible judgment to be made. There is a

²² Under the Railways and Other Guided Transport Systems (Safety) Regulations 2006 (SI 2006/599) the operator of the system may make use of a temporary crossover if they are satisfied that it can be operated in a safe manner.

further complication, relating to liability for making good damage. This is set out in section 82 (section 141 in Scotland) of the New Roads and Street Works.

“82. — (1) An undertaker shall compensate—
(a) the street authority or any other relevant authority in respect of any damage or loss suffered by the authority in their capacity as such, and
(b) any other person having apparatus in the street in respect of any expense reasonably incurred in making good damage to that apparatus,
as a result of the execution by the undertaker of street works or any event of a kind mentioned in subsection (2).
(2) The events referred to in subsection (1) are any explosion, ignition, discharge or other event occurring to gas, electricity, water or any other thing required for the purposes of a supply or service afforded by an undertaker which—
(a) at the time of or immediately before the event in question was in apparatus of the undertaker in the street, or
(b) had been in such apparatus before that event and had escaped therefrom in circumstances which contributed to its occurrence.”

A relevant authority includes a transport authority, but the scope of the impact of this section on a tramway is ambiguous. It is clear that a utility would be required to pay for the reinstatement of a tramway that was damaged in the course of carrying out street works or as a result of a failure of the apparatus. Under certain ill-defined circumstances, they would also be responsible for consequential loss, including loss of profit.

This provision will inevitably apply pressure on a utility company to require the removal of all apparatus from the vicinity of the tramway, with most of the expense falling on the promoter, rather than risk having to pay compensation whenever they need to work on it. This highlights another facet of the risk calculation. In order to persuade a utility to leave apparatus beneath or close to the tramway, it may be necessary for the promoter to reach an agreement with the utility to override the compensation provision, perhaps subject to certain measures being taken in advance.

Sewers frequently cause the biggest problems in this respect, as their depth and alignment may be constrained by the terrain and the need to drain properties on both sides of a road. It will often be the case that the sewers must remain beneath the tracks. The practical approach will then be to assess the condition of the sewer before the tracks are built over it, and if necessary refurbish it to an acceptable standard that is likely to ensure it will not need to be touched during the lifetime of the tramway. The sharing of costs, and the apportionment of risk in the event that there is a failure of the apparatus, or it needs to be altered, will need to be the subject of an agreement between the promoter and the utility.

All of the above factors will need to be taken into account when deciding an appropriate horizontal clearance between the tracks and apparatus belonging to a utility company. The final factor to be taken into account lies in section 93 (section 151 in Scotland) of NRSWA:

“93. — (1) This section applies to street works at a crossing of a railway on the level or which affect a tramway.

In this section "the relevant transport authority" means the authority having the management of the railway or tramway undertaking concerned.

(2) An undertaker proposing to begin to execute works to which this section applies shall give the prescribed notice to the relevant transport authority notwithstanding that such notice is not required under section 55 (notice of starting date).

The provisions of subsections (2) to (7) of that section (contents of notice, when works may be begun, &c.) apply in relation to the notice required by this subsection as in relation to a notice under subsection (1) of that section.

(3) An undertaker executing works to which this section applies shall comply with any reasonable requirements made by the relevant transport authority—

(a) for securing the safety of persons employed in connection with the works, or

(b) for securing that interference with traffic on the railway or tramway caused by the execution of the works is reduced so far as is practicable;

and, except where submission of a plan and section is required, he shall defer beginning the works for such further period as the relevant transport authority may reasonably request as needed for formulating their requirements under this subsection or making their traffic arrangements."

Before apparatus remaining close to the tracks can be worked on, the utility company will need to have its proposals vetted by the transport authority (that is to say, the current operator of the network), so that it can satisfy itself that the work can be carried out safely, without undue interference with the operation of the tramway. Operating procedures are normally developed and agreed between the system operator and utility companies before the tramway begins operation, so that the utility companies know in advance what will be required of them.

The insertion of a tramway into a street will add further congestion to the existing quantity of apparatus. One option to overcome this may be to move large apparatus, particularly gas and water pipes, into a parallel route. This is particularly suitable where the pipes concerned do not provide a direct supply to premises along the route.

3.3 Estimation of costs

The application for the order has to be accompanied by an estimate of the cost of carrying out the construction stage, including undertaking any necessary service diversionary works, as set out in rule 10(3) and Schedule 3 of The Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006. The question that needs to be answered at this stage of the project is: who should carry out the task of estimating the cost?

This is the equivalent of the C3 stage as set out in the Diversionary Works Code, in which the promoter submits a draft scheme to the utility and requests budget estimates. Once the promoter has obtained the powers needed to build the tramway, this estimate is to be provided free of charge. However, prior to that time, the utility companies are entitled to payment for estimates carried out by them. ***For this, and for the perhaps more significant reason that the utilities' estimates could possibly be wildly inaccurate and therefore misleading, it is better that they are carried out by consultants reporting directly to the promoter, using standard estimating techniques and pricing guides.***

There are certain risks in adopting this approach, which need to be considered. Firstly, the utility is likely to be aware of options for rationalisation of their own network that

may not be obvious to the promoter's consultants. There are also contributions available to the promoter from the utility in the form of cost share, and deferment of the time of renewal. While an appropriate allowance for the former can easily be made, making an allowance for deferment depends on knowledge of the age of the apparatus to be diverted.

3.3.1 Sharing of Costs

NRSWA recognises that it is equitable for the transport authority and the utility to share the cost of diverting apparatus to allow a transport undertaking to be constructed and operated. The subject of costs is considered in section 85:

“85.—(1) Where an undertaker's apparatus in a street is affected by ... major transport works, the allowable costs of the measures needing to be taken in relation to the apparatus in consequence of the works, or in order to facilitate their execution, shall be borne by the...transport authority concerned and the undertaker in such manner as may be prescribed.”

The proportion of costs to be borne by each of them is set down in the Street Works (Sharing of Costs of Works) (England) Regulations 2000. In relation to transport works, consideration is given to two categories of work, each of which is subject to a different apportionment of costs. For the diversion or protection of apparatus directly affected by the construction or operation of the tramway infrastructure, the cost of the works is apportioned in the ratio 92½:7½, payable by the transport authority and the undertaker respectively. If the diversion or protection is required due to a modification of the highway necessary to accommodate the tramway (for example, setting back the kerbline to widen the carriageway) the apportionment is in the ratio 82:18.

There is a condition attached to the allowance made by the utility, and that is that 75% of the net cost of the diversion (that is, the cost after the allowance has been deducted) will be paid by the transport authority in advance of the works being carried out.

3.3.2 Deferment of the time of renewal

The principle of deferment applies when the measures taken by the promoter and the undertaker result in a postponement of the need to renew the undertaker's apparatus²³. This may result from replacement of old apparatus by new, or from refurbishment of the existing apparatus, particularly in relation to a sewer. In either case, the work carried out will mean that it should not be necessary to renew again for a period deferred by the age of the apparatus being replaced. The benefit to the utility is valued in accordance with the Bacon Woodrow formula, as set out in Appendix E to the Diversionary Works Code.

According to the Code, deferment only applies to apparatus that is over a certain length – 100 metres in the case of pipes, and up to 500 metres for fibre optic cables and high voltage (over 33kV) electricity cables. The code does not address the case where the life of apparatus (for example a sewer) is extended by refurbishment rather than being replaced. Neither does it provide design lives for a number of significant

²³ see regulation 7(1)(b) of the Sharing of Costs of Works regulations

types of apparatus, e.g. sewers, and cast iron gas or water mains above 12" (300mm) in diameter.

It should be noted that the notional inflation rate quoted in the Code, 6%, has been superseded by HAUC Advice Note 2008/01²⁴, which establishes the current rate at 3½%. In future the rate used is to be pegged to the rate set down in *The Green Book – Appraisal and Evaluation in Central Government*, published periodically by HM Treasury.

As an example of the scale of cost reduction that might be available to the promoter, the reduction in cost (i.e. the amount absorbed by the utility company) on a piece of apparatus with an 80 year design life, that is 40 years old at the time of replacement, would be approximately 19%. Despite this, the average reduction on a project as a whole due to deferment is unlikely to be greater than 5 to 10%, due to the limitations on the lengths of apparatus that will qualify for inclusion in the calculation.

3.4 Programming the works and assigning responsibility

A notional programme of diversionary works needs to be planned along with the preparation of the cost estimate. This will provide a better understanding of the merits and demerits of the alternative approaches to setting up the main contract. In particular, decisions will need to be made about who will plan, co-ordinate and supervise the diversionary works.

4 At initial tender stage

4.1 Introduction

The advice given by the Department for Transport is not to start the tendering process until an order is granted and the outline business case has been approved. However, a project needs to go through progressive stages, which may not fit neatly into governmental time scales. The process of applying for a Transport and Works Act order makes it necessary to carry out a fairly detailed design of the tramway alignment and the associated alterations to the highway. The thinking behind the design decisions will need to be captured to allow plausible answers to be given to objectors against aspects of the scheme. Collecting this information together forms a significant part of the preparation of tender documents. There is clearly a risk in preparing a complete set of contract documents before approval to proceed with the scheme has been given; at the same time if no progress has been made in this respect, the scheme will be delayed while documents are prepared, resulting in additional costs being incurred. The working relationships established with the utility companies during the consultations leading up to the Transport and Works Act inquiry need to be developed throughout the project. It is to be hoped that this will lead to the most satisfactory decisions being taken with regard to diversion and protection of apparatus. In particular, the promoter should seek to influence the location in which new apparatus is introduced along the proposed route of the tramway, to avoid the need to divert it soon after it is initially installed.

²⁴ Available for download from www.hauc-uk.org.uk/category/2/, but due to be replaced in the near future by an updated advice note

An action that needs to be taken as soon as the order has been granted is to issue notices under section 85(2)(a) of NRSWA. The purpose of these notices is to safeguard the route by advising utility companies not to install further apparatus where it might be in conflict with the future tramway.

The provision is expanded in regulation 6(3) of the Street Works (Sharing of Costs of Works) (England) 2000²⁵:

“ 6(3) In calculating an undertaker's allowable costs there shall be disallowed costs incurred in respect of apparatus placed in the street after the authority has given to the undertaker -

(a) in the case of major works consisting of major bridge works comprising a replacement of the bridge, not more than 10 years;

(b) in the case of any other major works, not more than 5 years,

notice of their intention to execute the major works.”

The notices need to be served individually on each utility installing or contemplating the installation of apparatus along the tramway route. They are to be recorded in the street works register by the transport authority. In practice this means the notice will need to be given to the street authority for them to enter it into the register²⁶. The notice does not prevent a utility from installing further apparatus in the street affected by the notice. However, if having done so they then need to move it again because it interferes with the construction or operation of the tramway, and the tramway work has begun within five years of the notice being given, the utility will have to move it at its own expense.

It should be noted that the procedure for giving notices has not been fully thought through by the drafters of the regulations, and it may ultimately require a court case to interpret them correctly.

4.2 Contents of tender documents

The philosophy adopted by the promoters to this point needs to be clearly spelt out in the documents, and also the permitted departures that may be adopted by tenderers. In preparing the tender documents, it is important to set out the current position with respect to utility planning and diversion works as clearly as possible for the benefit of the tenderers. If further work is to be carried out by the promoter during the tendering process, the scope of this work should be explained, and updated as necessary during the tendering period. Tenderers should be made aware of the responsibilities that they will take over in relation to the utilities, and any that will remain with the promoter. Any undertakings given to utility companies in the course of the application for the order should be recorded and made available to tenderers. The terms of a contract should be as certain as possible if the outturn cost is to bear any resemblance to the tender price. A tenderer cannot price accurately if he cannot be sure what he is

²⁵ Or in Scotland, the Road Works (Sharing of Costs of Works) (Scotland) Regulations 2003 (SSI 2003/509); and in Wales the Street Works (Sharing of Costs of Works) (Wales) Regulations 2005 (WSI 2005/1721)

²⁶ See the Table to regulation 4(5) of the Street Works (Registers, Notices, Directions and Designations) (England) Regulations 2007 (SI 2007/1951) and the equivalent Scottish and Welsh regulations (2008 in both cases - SSI 2008/88 and WSI 2008/540, respectively)

expected to do, and will either qualify the tender accordingly, or include a large sum as a contingency against the risk of uncertainty.

4.3 C3 and C4 Stages

The Diversionary Works Code recommends a procedure to be followed throughout the duration of a major works scheme, such as the planning and construction of a tramway. The procedure is set out in Appendix C; the promoter will already have taken action on the recommendations of paragraph C2, namely the collection of records of the positions of apparatus belonging to utilities likely to be affected by the tramway. However, records will not remain current indefinitely, and new sets may need to be obtained on more than one occasion before diversion works is undertaken. The promoter will also have made an estimate of the cost of diverting or protecting apparatus. Once the order has been made and has come into force, it will be time to move onto the next stage, which is to request a C3 budget estimate.

Ideally this stage will be undertaken before tenders are requested. However, the appropriateness of making such a request will depend on the nature of the responsibilities to be passed from the promoter to the eventual contractor or Concessionaire. On the basis that avoidable risk should be minimised to obtain the best value for money, it is advisable that the scope, cost, duration and responsibility for control of the diversion works should be established before a tender offer for the main construction is accepted.

The C3 estimate should be considered as a check on the budget estimate carried out in-house for the purpose of making the order application. It should be considered critically, bearing in mind that at this stage the promoter's engineering team should have a better understanding of the nature of a tramway than the utility's engineers. When the proposals are considered to be significantly in error, whether over- or underestimated, there should be an entry into a risk register, recording the anticipated range of the error and the probability that the error will materialise. These figures will be included in the overall calculation of the probable cost of the scheme.

The scope of the information to be provided at this stage is spelt out in the Code:

"C3 DRAFT SCHEMES AND BUDGET ESTIMATES

The authority should submit, to undertakers, details of the proposed scheme, which normally comprise preliminary alignment and levels, where appropriate.

Undertakers will respond with details of the effects on their apparatus together with budget estimates, which would usually be established via a desktop survey based upon current plant records. Where undertakers are not aware of the general position of the line and depth of their apparatus, they shall at this stage take any necessary steps to determine this information. Undertakers shall also indicate any special requirements involved such as -

- i. items of equipment on long delivery and the need for advance ordering*
- ii. interruption of supplies to consumers*
- iii. disconnection of supplies to premises which are to be demolished*
- iv. special wayleave agreements associated with the diversion of their apparatus*
- v. early access to sites for the construction of special structures such as sub-stations, pressure regulation stations etc.*
- vi. planning consents or special ministerial consents*

vii. *any other high-risk critical items or issues.*

Budget estimates provided by undertakers should include all direct costs and overheads likely to arise from the necessary measures in consequence of the authority's works as far as can reasonably be assessed at the draft design stage. These cost estimates should be based on current rates and be provided normally within 20 working days."

The provision of the estimates may be followed by meetings to clear up misunderstandings and seek to refine their accuracy to a level commensurate with the standard of design provided by the promoter.

The first time a C3 estimate is requested by a transport authority (namely one that is authorised by statute to construct the undertaking that is the subject of the request), it will be provided free of charge. However, if the request is repeated, the utility company will be entitled to make a charge.

Further work will be carried out on the scheme, up to the point where it can be considered to be a full detailed design. For the purposes of planning diversion works, it is not necessary for this to itemise, for example, the reinforcement in the trackslab, or even necessarily the exact width or depth of the trackslab. Other aspects of design that may need to be considered are overhead line design and alterations to the highway layout. However, what constitutes a detailed design for the purposes of planning diversionary works will have to be decided for each scheme.

Once the appropriate level of detailed design has been attained, the promoter (assuming he is going to take responsibility for this stage of the works) should request a C4 estimate from the utility companies. The Code of Practice describes this procedure in the following words:

"C4 DETAILED SCHEME AND DETAILED ESTIMATES

Following joint discussions, the authority should submit to each undertaker details of the design with working drawings and an outline programme. The undertakers should respond, normally within 25 working days, by providing details of their requirements as follows:

- i. *Description of the necessary measures, clearly stating the reason for diversion or protection and giving details of the existing apparatus affected, such as lengths and sizes of pipes/cables/ducts, depths of cover and ages. See section C1.4 on the possible need to confirm positions of apparatus.*
- ii. *A detailed specification of the works required as appropriate -*
 - (a) *details of all replacement apparatus, i.e. lengths, type, material, size and routes, drawing attention to those materials with long-lead times on delivery.*
 - (b) *details of all protection work*
 - (c) *advance or off-site works*
 - (d) *method of construction and sequence of operations where these have a significant effect on cost or programme*
 - (e) *arrangements for delivery of materials and storage requirements*
 - (f) *route and level requirements, trench dimensions, methods of excavation and assumed ground conditions*

- (g) *reinstatement requirements, backfill specification, type of reinstatement (temporary, interim, permanent) and removal of surplus spoil*
 - (h) *details of temporary works*
 - (i) *any special requirements, e.g. provision of temporary accommodation for staff*
 - (j) *details of the requirements for commissioning of apparatus, e.g. original apparatus having to remain commissioned until all services are transferred*
 - (k) *method of dealing with apparatus made redundant by the scheme, e.g. recovered or abandoned in situ.*
- iii. *A detailed estimate based on current rates with itemised direct costs also to include:*
- (a) *overheads*
 - (b) *details of the likely allowance for deferment of renewal based on the formula set out in Appendix E and for betterment given in Appendix F.*
 - (c) *allowance for any materials recovered*
- NOTE** *(if works are to be phased over a long period of time, estimates for each phase may be appropriate)*
- 2.1 iv. *Provisional programmes and timescales for works including as appropriate:*
- (a) *site works*
 - (b) *off-site works*
 - (c) *time for obtaining materials with a long lead-time on delivery*
 - (d) *land purchase*
 - (e) *wayleaves acquisition”*

It is important to appreciate that the Code is more normally used for relatively minor highway junction improvements. The suggested time scale for provision of the estimate, 25 days, is not likely to be achievable in its application to a tramway scheme.

As with the C3 estimate, there should be an opportunity for discussions between the transport authority and the utility company to consider ways in which the scope and cost of the diversion works can be reduced. Utilities are entitled to require payment for the work that they undertake at this stage. As the work follows from the section 84 requirement for the two parties to identify the works necessary, payment will be made in accordance with section 85 of NRSWA: i.e. “...*the allowable costs of the measures needing to be taken in relation to the apparatus in consequence of the works, or in order to facilitate their execution, shall be borne by the highway, bridge or transport authority concerned and the undertaker in such manner as may be prescribed.*” In other words, the costs of preparing C4 estimates are allowable costs. This means that the design work is subject to the Street Works (Sharing of Costs of Works) (England) Regulations 2000, and that the undertaker is required to absorb 7½% or 18% of the cost, as appropriate, so long as the promoter has paid 75% of the net cost estimate in advance of the works being carried out. It is recommended by HAUC that in fact the full estimated cost should be paid in advance of the preparation of the C4 estimates. This is because a large number of estimates are carried out for projects that are not pursued, and it is unreasonable to require utilities to contribute to aborted works. If this approach is adopted, then the utility’s contribution should be applied as an offset to the total cost at the final account stage.

5 At BaFO stage

5.1 Introduction

By this stage, it must have been made completely clear to the parties presenting the best and final offer what their role is to be in relation to the utilities. This will determine whether and to what extent the risks associated with the diversion works have been transferred from the promoter to the Concessionaire.

The Best and Final Offer (BaFO) stage of a bid is used in the process of setting up a Private Finance Initiative (PFI) type of contract. This is one in which the contract to construct, operate and maintain the project is let to a single contractor, with the operation being carried on for a term of years. As a rule the ownership of the assets remains with the promoter of the scheme, and the use of the assets is returned to him at the end of the concession period. This method of procuring a tramway is not considered by all to be the best available, and the preference of some promoters is now to separate the design and build aspects of the project from the operation and maintenance. However the project is structured, it is important for the promoter to benefit from a whole-life approach to the design and maintenance of the light rail system, and for the form of contract to incentivise this approach wherever possible.

This is the last stage at which the promoter should be involved with the development of a PFI project, unless the risks associated with diversion of utilities' apparatus have been explicitly retained by him. Otherwise, once the contract has been signed and financial close has been reached, it is important for the promoter to avoid overriding the risk-taking and management roles assigned to the Concessionaire.

“There must be a clear limit to the extent of Authority participation as involvement to a greater extent than is appropriate may lead to the Authority taking back both a risk it is paying the Contractor to accept and a management role it is paying the Contractor to deliver. It will not be appropriate for the Authority to adopt the type of overseeing role it might traditionally expect to have when procuring stand-alone construction or development services.”²⁷

By now, all the information gathered by the promoter concerning the scope and cost of diverting apparatus needs to have been transferred to the preferred bidders. The bidders will then assess the risk associated with any information missing, and adjust their bids accordingly. The risk areas will include:

- Inaccurate estimating by the utility companies;
- Errors in identifying the scope of the works;
- The cost of traffic management;
- Problems associated with integrating the programmes of all utility companies with their own construction works;
- Ensuring that public relations initiatives serve to maintain goodwill for the project.
- Uncertainty about the value of deferment of time of renewal contributions, due to lack of information about the age of apparatus to be diverted.

²⁷ Standardisation of PFI Contracts V.4

If the promoter has decided to keep the responsibility for overseeing diversions for himself, this is the stage when work is likely to start, and he will need to consider the issues set out in paragraphs 5.2 to 5.5 below.

5.2 Orders for the work

Orders for the agreed diversion works need to be issued to the affected utility companies. The procedure is set down in paragraph C6 of the Diversionary Works Code. An advance payment for the works, in accordance with the regulations as explained in paragraph 3.3.1 above, should accompany the orders if the transport authority intends to adopt the principles of the sharing of costs regulations. If the work of any utility company is expected to spread over a considerable length of time – say 6 months or more – it is normal for the transport authority and the utility to agree a schedule of payments by the authority, rather than a single payment, based on expected progress on the scheme.

In cases where utilities have drawn attention at C3 stage to special requirements associated with their apparatus, it may have been necessary to commit expenditure at an earlier date. This would be the case for example where materials take a particularly long time to acquire, or where land needs to be acquired compulsorily to provide an alternative route for diverted apparatus.

The Code includes an earlier stage, C5. This is mentioned for completeness, but it is advisable to treat it with some caution.

“C5 FORMAL NOTICE AND ADVANCE ORDERS

Formal notice of the authority's intention to proceed with the scheme should be served on the undertakers. Unless otherwise stated, the formal notice will be taken as an instruction to the undertaker to proceed with advance ordering of those materials which have long delivery periods and to undertake those works which require more extensive preparation. It is possible for the authority to serve formal notice at an earlier stage of the procedure but it is preferable to have done so following consultation and receipt of proposals from the undertakers.

The undertakers should acknowledge receipt of the notice and respond with a detailed specification, itemised estimate and programme if not already submitted.”

This is the equivalent of supplying a letter of intent, and will be subject to the same dangers. As the overall procedure revolves around the formation of an agreement, it is better to deal with the question of advance ordering through the agreement. Payment will need to be made for materials ordered in advance at the same time as any instruction to place the orders, to ensure the cost sharing provisions continue to apply. However, in the view of HAUC, the service of a C5 notice will serve to stop the clock in relation to a section 85(2)(a) notice. That is to say, that any apparatus obstructing the tramway works that was installed between the service of a s.85(2)(a) notice and the issue of a C5 notice, so long as the latter is served no more than 5 years after the former or ten years in the case of major bridge works), will have to be moved or protected at the expense of the utility.

5.3 Traffic management

A programme of diverting apparatus will inevitably disrupt normal traffic patterns for a time. Temporary Traffic Regulation Orders will need to be produced to implement a

range of measures, from closing a carriageway, to introducing or lifting one-way restrictions, introducing or lifting restrictions on straight ahead or turning movements, creating or suspending parking spaces and similar measures. On occasions this may involve physical works to alter the highway layout, particularly at junctions. More drastic measures are sometimes needed: in Manchester it was necessary to create a new bus station to replace capacity lost in the existing one while diversion works were carried out.

Contract documentation will need to clearly set out the responsibilities for traffic management during the diversionary works, recognizing that the ultimate responsibility for co-ordination with other schemes in the same area lies with the street authority²⁸ and the traffic authority.²⁹

Traffic management is considered in more detail in the UKTram publication *Guideline 2: Mitigation of utility diversion requirements*.

5.4 Programme issues

A programme of works will need to be drawn up to avoid utilities' activities conflicting with each other, and to take account of continuing traffic management requirements (including management of pedestrians). If the promoter is controlling the works, it should be planned so that there is little or no interference with the main contractor's track construction programme. If on the other hand the responsibility is to be passed to a Concessionaire, there will be additional complexity.

The programme will start with durations for items of work supplied by the utility companies. The overall pattern of working will need to be established, and a master programme developed that accommodates the work of all utilities. This will take into account traffic management measures agreed with the highway authority's traffic manager. The overall duration of the programme is likely to be greater than the sum of the individual parts, because some of the utilities will be held back while others complete their works in a designated area.

The programme must not overlook durations associated with non-work items, particularly notice periods. Advance notice must be given by anyone wishing to excavate in the highway, mainly to assist the highway authority to co-ordinate works that are likely to disrupt traffic. Periods of notice are set down in the Street Works (Registers, Notices, Directions and Designations) (England) Regulations 2007. Generally, advance notice of not less than three months is to be given of the intended start date of the works, subject to the exceptions set down in the regulations. Nearer the time when work is to begin, a further notice of not less than 10 days is required. By designating a street as traffic sensitive, the highway authority may direct the utility to carry out works only at certain times, or on certain days, and they may also effectively require them to alter the proposed route of the diversion to avoid certain streets. Certain streets containing hidden structures, designated as streets with special engineering difficulty, will require additional measures to be agreed with the owner of the structure, by the approval of plans and methods of working. Both traffic sensitive streets and street with special engineering difficulties are considered below.

²⁸ S.59 NRSWA

²⁹ S.16 Traffic Management Act 2004

Traffic authorities have power to introduce a system of permit schemes. Under this system (which will be introduced at the discretion of the traffic authority, subject to the approval of the Secretary of State), it will be necessary for anyone wishing to obstruct the carriageway to apply for a permit. The permit will have to specify the starting date, duration and extent of the works, based on information provided by the utility company. The advance notice required for obtaining permits will be specified in the individual permit schemes of the various permit authorities, but is unlikely to be less than 3 months.

Where a permit scheme is in force, there will be no requirement to give additional advance notices under NRSWA.

Where movement of traffic on the highway needs to be restricted and a temporary Traffic Regulation Order is to be made, the normal timescale for obtaining the order would be in the region of six to eight weeks.

All these requirements need to be built into the programme. Account needs to be taken of developments and events, such as parades, road races and so on, taking place on or alongside the route of the tramway. Where a site is being redeveloped, it is important that any services installed to serve the site do not come into conflict with the track construction. Many local authorities place restrictions on the excavation of the highway in main shopping areas for a period preceding and immediately after Christmas, which generally lasts for about two months.

Benefit may be obtained if agreements can be reached between utility companies to place their apparatus in a common trench. This is not uncommon in the case of cable companies, and leads to a reduction in costs of excavation and reinstatement.

5.4.1 Traffic sensitive streets

Certain streets may be designated as traffic sensitive by the street authority, in accordance with s.64 of NRSWA. The designation will be recorded in the street works register. A street can only be designated as traffic sensitive if certain criteria are met, as laid down in regulation 16 of the Street Works (Registers, Notices, Directions and Designations) (England) Regulations 2007. If the criteria are only met on certain sections of the street, or at certain times of the day, then the designation will only apply at those times or in those sections.

The designation ties in with s.56 of NRSWA, which gives a street authority power to give directions as to the timing of any street works. Where the works are to be carried out in a traffic sensitive street, the work will be required to be carried out during periods when the designation does not apply. If the street is traffic sensitive at all times, the street authority will seek to use its other powers to move the work to a different street if at all possible.

The cost of carrying out diversion work in a traffic sensitive street is likely to be greater than comparable work in a non-sensitive street. However, in all probability a traffic sensitive street is unlikely to be a suitable street to contain a tramway, as it would be very difficult to guarantee the maintenance of the timetable.

5.4.2 Streets with special engineering difficulties

If a street contains an engineering structure which is crucial to the integrity of the street, the street authority may designate the street as one having special engineering difficulties. This may arise because the street crosses a bridge or is crossed by a bridge whose foundations extend into part of the street. Other justifications for a designation might be the presence of particularly large apparatus belonging to a utility, or indeed the presence of a tramway.

The designation is made under s.63 of NRSWA. Anyone carrying out works in such a street is required to provide details of the works they propose to carry out to the owner of the structure, including plans and sections, and comply with their reasonable requirements.

Once a tramway has been constructed, the tramway authority should request the street authority to apply the designation to the street to ensure that utilities are aware that it is present and take suitable steps to avoid damaging it in the course of their street works.

5.5 Public relations

Good and consistent communication with the public directly affected by the works can have a significant influence on the success of the project. Occupants of residential properties, including hotels, need to be considered if work is to be carried out during hours of darkness. During the normal working day, businesses along the route may be affected if access is restricted, either because of a reduction in their normal passing trade, or because delivery of supplies is hampered. Travellers may be affected due to enforced changes in bus routes, or changes in the location of taxi ranks. Delivery vehicles may find their usual routes blocked, and be insufficiently familiar with the area to improvise an alternative. Emergency services need to be kept up-to-date with available routes at all times. It is vital that all potentially disruptive activities should be given adequate advance publicity.

6 At contract award

By this time all important decisions need to have been taken. If the promoter is supervising the works as a separate advance contract, it should be well under way. Otherwise, this is the last opportunity to ensure that the Concessionaire is in possession of all information concerning the diversion works that is available to the promoter.

7 During construction

7.1 Introduction

If the control of diversions has been passed to a Concessionaire, it will now be their responsibility to plan, co-ordinate and programme it. This leaves open the question of payment, which might remain the responsibility of the promoter. If on the other hand the promoter has set up the diversions as a separate advance contract, he will retain responsibility for a number of residual aspects of the work.

7.2 Day-to-day control

Work on their apparatus is carried out by the utility companies under their own statutory powers. It is important to understand that there is no contract between the utility and the promoter, or the Concessionaire. Consequently, it is advisable that no attempt should be made to interfere with the way the work is carried out, otherwise there is a risk that the promoter will find itself taking responsibility for faults in the utility apparatus. It is strongly recommended that, if the promoter feels it necessary to carry out works on behalf of a utility company, the utility should be given rights under the Contracts (Rights of Third Parties) Act 1999 to make claims against the promoter's contractor in the event of their failure to install apparatus properly.

The promoter's involvement should be limited to recording the progress of the work, and ensuring that the apparatus is being placed in agreed positions. A transport authority also has rights under section 81 of NRSWA, which are relevant in this situation. A utility has an obligation to maintain its apparatus to the reasonable satisfaction of a transport authority, so as to ensure that it does not have a detrimental impact on any land, structure or apparatus belonging to it. Consequently if the standard of workmanship is such as to give rise to the possibility that the integrity of the tramway would be compromised, the transport authority would be entitled to intervene to have the work brought up to standard. There are potential benefits from a single contractor carrying out elements of the diversions work on behalf of the utility companies. It should however be made clear that this work should be completely independent of any contract between the promoter and their contractor, even if the same organisation is employed by both the promoter and the utility companies.

7.3 Responsibility for delays and incorrect information

The contract for the main construction should have spelled out who will take the risk of delays to the diversion works contract. Delay risks will normally either have been transferred entirely to the Concessionaire, in the case of a PFI contract, or retained by the promoter, but this may be modified where the action of one party to the contract has an adverse effect on the other. Similarly, there needs to be an allocation of risk by the contract if information passed by the promoter to the Concessionaire proves to be incorrect.

There is a need in a PFI contract, so far as possible, to avoid arranging the diversions so that a Compensation Event could arise. However, the failure of utility companies to perform to expectations is specifically referred to as a Relief Event, meaning that additional time is allowed for the main contract to be carried out, but no extra costs.³⁰

The bearer of the risk, either promoter or Concessionaire, may wish to seek to recover losses from a utility whose poor performance has led to the loss. As there is no contractual relationship between either the promoter or the Concessionaire on the one hand, and the utility on the other, losses cannot be claimed as damages for breach of contract. However, it is possible to seek redress under the provisions of section 84(4) of NRSWA:

“ (4) If the authority or the undertaker fails to comply with an agreement between them as to any of those matters, or with the decision of the arbitrator under

³⁰ Standardisation of PFI Contracts v.4, paragraph 5.3.2.1

subsection (3), the authority or undertaker shall be liable to compensate the other in respect of any loss or damage resulting from the failure.”

The matters referred to are the identification of the measures necessary, the settling of a specification, and co-ordination of the measures with the work being carried out by the transport authority. ***Consequently, if a utility company fails to complete its work within an agreed timescale, the transport authority would be entitled to be compensated for any losses it incurred through the contract with the tramway constructor. At the same time, if the tramway constructor causes a delay to the utility, then it will be the utility company that will be entitled to the compensation.***

7.4 Final account

The costs paid in advance by the transport authority will have been based on an estimate of the overall costs of the diversion works. The final cost may be significantly different from this. Any major variations to the work should be valued as they are identified so that the approximate value of the final account can be anticipated throughout the duration of the project. However, the authority is obliged to pay their percentage of the actual costs incurred. They are entitled to audit the costs charged to ascertain that they are reasonable.

The costs of the work will include a percentage for the utilities’ overheads, although there will be no mark-up for profit. It is usual for the utility company to let the work to a contractor, who may be the utility’s regular term contractor, and the contractor’s rates will include an element for their own overheads and profit. The make-up of the utility’s overheads is determined statutorily by the Street Works (Recovery of Costs) (England) Regulations 2002,³¹ and defined in regulation 6.

The costs to be paid by the transport authority to the utility are those costs which are allowable, which is synonymous with costs that are reasonably incurred by the utility. Allowable costs exclude:

- The cost of providing records of apparatus, and the first estimate of costs at C3 stage;
- The excess costs of providing betterment. Betterment arises when a utility company takes advantage of the replacement of its apparatus through diversionary works to install apparatus of a greater capacity. The amount the authority is required to pay is only the cost of replacing apparatus like-for-like.
- The cost of diverting apparatus that was installed after the authority has served notice under section 85(2)(a) of NRSWA.

It is also probable that any costs incurred by the utility company under section 74 of the Act are not allowable. This provides that if works being carried out by a utility company are not completed within a reasonable period, the highway authority may make a charge for the occupation of the highway. Such charges are in effect fines, which should not be passed on to transport authorities. The same would apply to any fines incurred by utility companies for failing to comply with statutes, such as failing to give the mandatory advance notice of carrying out works³², or failing to execute works in a safe manner.

³¹ SI 2002/2091

³² SI 2002/2091

APPENDIX 1

UKTram Activity Groups

Activity 1 – Protection and Diversion of Apparatus

Activity 2 – Tram Design Standards and DDA/RVA Issues

Activity 3 – Signing and Highway Interface

Activity 4 – Noise and Vibration

Activity 5 – Network Rail Interface

Activity 6 – Trackform Design

Activity 7 – Benefits included in the Appraisal Process

Activity 8 – Commercial Structure

Activity 9 – Operational Performance Measures

Activity 10 – Tender Documentation

Activity 11 – Wheel/Rail Interface

Activity 12 – Traction Power Supplies