

13/05/14

13th May

PB - Info provided to NWLTF has some missing parts and perhaps an error in it – the hardcopy handed over on Friday 09 May.

GJ - Mr Cheek has looked over them – we would also like to see the additional info on it. Mr Cheek is putting together a rebuttal to the new info given in – this will be to Mr Hansen.

RW – we will circulate those. These docs have been included in library along with the amendments to the traffic regulations document (a-13).

Longley – Fed of small businesses has small no. of questions for mr robertson

Gj – are there any changes to the scheme (in ref to a-13)

RW - doc 1-0-5 which gives necessary info on the modifications – the changes to the TRO brings it in line with the updates of the March changes to the TWAO.

EVIDENCE IN CHIEF OF ROBERTSON

QC – I will call mr Robertson. You should have a summary proof and appendices and an orata sheet circulated on Friday. You're Gordon Robertson [summary of his role].

[reads out the summary proof]

Qc – go through the points in the Orata sheet. The first one involves 4 sheets of paper 1pp-6-6-3 pages 68, 69, 70, 71 – what's gone wrong?

Gr – they are labelled 6.5 now (the replacement sheets for the appendix labelled 6.5 now) – pages 68-69 has now got the correct data, the following two pages only had one no. wrong – therefore we've handed out the complete four pages.

Inspector – are these numbered page 69-71?

Gr – in my app 6-3-3 – it's the numbers at the bottom.

Qc – do you have the orata sheet new 4 pages, sir?

Inspector – yes

[inspector is missing the final appendix doc]

Gr – the eighth number down is 2 and should have been 18 – that's changed from the original version.

Qc – second of the questions

Gr – the remaining three corrections are details in the rebuttal evidence where unfortunately in the crossing of emails small mistakes were made. First point – response to leeds cycling campaign 2.10 – 'left turning vehicles... into shore lane and palmer road'. 2 other errors [now amended in fresh 4 pages]

Qc – proof at 3.29 – you say that factors work together piecemeal – and that a comprehensive approach is needed to deliver minimal delay. Please summarise what you mean by need for a comprehensive approach?

Gr – [tries to explain in a complex way]

Qc – just what you do on a day to day basis?

Gr – I look after UTMT section, we look after traffic signals – majority controlled by a central computer by a sophisticated system. We have been delivering bus priority at key junctions. By a comprehensive approach – to deliver good journey times etc we need to combine a good route with good junction designs and good control systems and good info on arrival times of the vehicles.

Qc – appendix that follows that junction analysis, turn to page ‘strategic priority buses, trams and...’ - a diagram on page 8 of 13 – three bands j1,2,3 representing three junctions – shows how to get a vehicle through three sets of green lights on a clear way. Can you explain how it is that junctions can be manipulated so as to allow a vehicle (e.g. tram) through those 3 green lights in a row.

Gr – context – the principle we are working on is that we will know where the ngt vehicle is at any point. We know where it is and at any particular junction we will have an expected arrival time for next vehicle. As the vehicle gets nearer the junctions are nudged a little closer to the desired staging to give ngt a green signal. This diagram shows simplistically the ‘nudging’ stage followed by a final move.

Qc – you said you know where the vehicles will be and expected arrival time – what does that mean as to the extent of which you hope to have a ‘nudge’?

Gr – how much you have to move a set of signals depends on the arrival time etc. the nudging is not notable to local traffic (e.g. pedestrians and other vehicles) so that when ngt arrives and we line up the green there is no congestion, hardly any awareness

Qc – page 8-13 – a vertical dash blue line indicating point vehicle is protected – what happens next as the vehicles make way to mode 2 and 3?

Gr – re: ngt vehicle approaching. We know where the ngt vehicle is – at an appropriate time we move into what we call mode one. The initial nudging of the traffic signals so they move into position when they are nearly ready for the ngt vehicle. Although we have predicted arrival time – its not guaranteed when its arrived. So nudged into an appropriate position, and when ngt gets close, you enter into mode 2 and so forth. The ngt goes through. We are looking at three junctions that are all being moved at the same time.

Qc – the dash blue becomes a solid blue line – indicating vehicle going through. Whats mode 3 all about when vehicles go through

Gr – compensation mode – depending on how much we’ve manipulated green times for other traffic, mode 3 will compensate so that traffic capacity is maintained

Qc – para 3.19 main proof – buses – this is the ngt scheme being built and what is proposed in respect of buses

Gr – we will be providing bus priority at junctions along the route as indeed we do at the moment. The intention would be the vast majority of junctions will have a form of bus priority – applying to late buses because if bus is early/on time it doesn’t need help. That would help keep timetable. There is conflict – if the late bus arrives at same time as ngt, there will be priority for ngt. Late bus has to wait until ngt vehicle has been serviced.

Qc – para 3.30 on page 10 – there is a practical limit to the no. of vehicles per hour in each direction that can be afforded the highest level of priority at traffic signals. You allow the highest priority to be given to ‘peak direction ngt vehicles’ - What is this ‘peak’?

gr – it depends which junction we’re talking about. Some junctions both directions get the same green therefore both ngt and a late bus would get a benefit from the same change in signal timings. But there are some junctions where the non-peak direction actually requires a diff stage from the peak direction ngt – those times we will give priority to the peak directions – morning peak and in evening peak

qc – why is it you say there is a practical limit to the no. of vehicles that can be offer the highest priority?

gr – that follows from the way I have described the system, that we are lining the signals up quite some way in advance of the arrival of ngt vehicle to enable greens to be delivered without disrupting traffic or causing safety issues to pedestrians – we need to know the arrival in good time. We are manipulating the signals appropriately. So if we are talking about ten ngt’s per hour at shore line signals/elmer road – and they operate on a 120 sec cycle time – that is one ngt vehicle every three

cycles – that's tight, allows one cycle to prepare, one to get vehicle through, and one to recover. If we had more vehicles – well there's a limit to how much we manipulate junctions. In order not to cause disruption you would end up delaying the vehicles somewhat. It does vary according to junctions - there are some junctions where ngt is aiming for a long green period and others where the window is shorter – it varies. When I say there's a practical limit, it's not that one falls off the edge of a cliff if there are more than 10 vehicles....just that there will be a rapid loss of priority.

Inspector: what happens if there is a delay to ngt vehicle somewhere along the line? And there's bunching... do you have any adjustment you can make that you can assist that? Or does it disrupt the whole system?

Gr – intention is not to disrupt whole system. If there's a close following ngt – that vehicle will probably not get the same priority and hopefully this will slow it down. My expectation is that ngt operator will have measures to prevent bunching, with one vehicle every 6 min there is less of a likelihood of bunching.

Qc – mr turner and cheek's rebuttal to the promoters. Mr turner's [923-13] – page 24 – please comment on these.

Gr – first para where he asks about what would happen if ngt received only 90% of the priority planned – what impact would it have 90% is not a meaningful phrase – the priority given to ngt is a level of priority dependent on early detection of ngt – the priority given to buses is dependent on detecting them at a fairly short distance and given them an extended green, at the moment. I can't comment on his assertion as I don't think that question appreciates the sophisticated system we are using for ngt. He also comments on whether buses can benefit on priority given – they do benefit depending on where they are etc. both on the junction design and priorities we will be offering. I've already commented on para 7.3 - asks what will happen if both bus and ngt call at same time – ngt will get priority but there are many junctions where they will both benefit

Gr – para 7.4 – bus priority at pedestrian crossing – pedestrian crossings contribute v. little to average delay for a bus but it can contribute very significantly as to the variability. There aren't many buses that will get stopped at say six ped crossings along the route but if one bus does get stopped at many pedestrian crossings on the route then it will delay that vehicle significantly. I am accepting that it does make little delay to average journey time but it does contribute to reliability and helps to reduce lateness factors.

Qc – and what's the position please, in terms of green and pedestrian priority in terms of ngt

Gr – buses and ngt will get the same priority at those pedestrian crossings

Qc – anything you want to pick up ref 7.5?

Gr – any way that buses are made more like ngt vehicle does make it easier to give them priority. Comment in d) relating to my comment –

Qc – app 2 and diagram of page 8-13, explain how a bus stop being close to a signal through which you are trying to get the vehicle...can effect delivery of three straight greens?

Gr – if you are thinking about an individual vehicle, the further away we can plan the green time the easier it is to provide greens without disruption. We are adjusting green time possibly a couple of stops away for ngt –because ngt stop times are quite predictable. At the moment, this isn't the case with buses at the moment. The diagram on page 8 in appendix actually shows three or four cycles before a vehicle hits the first green – we are manipulating the green time to make sure the vehicle goes through. Bus stops vary along the route and some are closer than others. Some bus stops are closer than others but in terms of the cycle time an outbound bus at hyde park coming into a bus layby in my terms is v. close if hyde park junction just moved to pedestrian stage – too late, the bus will just have to wait.

13/05/14

GR - Bunching - obviously the main problem causing buses to bunch is the variable loading times – as soon as you move to unequal gaps between buses there are more people loading on the first bus. There is a significant limit as to what we can do as to signal priority to correct that.
Comment on 7.7 – refers to other city priorities esp in London – as far as I know there aren't any other cities giving any priorities approaching that we are giving here. Leeds system will be vastly better than London or anywhere else. There are two methods of bus priorities given in London – Scoot and Hurry call

Qc – mr cheek secured info from Croydon relating to trams and the hurry call system. Let's deal with the London buses first.

Gr- London buses – the Scoot system of controlling traffic signals is a dynamic system which runs transit all the time – counting traffic stop times and seeking to adjust signal timing – we don't use it in Leeds as we prefer to change green times. Bus priority in scoot works by putting into the signal bus links and calculations take account and puts higher priority on bus delays. London claims there is a 10-30% delay reduction. That is difficult to pin down as buses still get stopped at signals... they can't deliver this top level priority as they don't have the logic in the Scoot system that can deliver what we're delivering

Qc – what about 5.3 cheek's rebuttal ?

Gr – Croydon – fwy 115 (print out of the web ref of bottom of page 12)

Qc - let's take up fwy 115.

Gr – slightly confusing doc as FOI response keeps repeating the question. Page 4 of 11 – so the first couple of questions are factual about what junctions have got priority. If we turn over to page 6 – I notice that first of all the description of the system is that trams are detected around 150-200m from the junction. 2 lines after that it says that the demand registered signal - hurrycall system – this system doesn't care what it's doing at the moment but must deliver the highest priority to tram – v disruptive to traffic. Cons – might miss a stage (ppl expecting their stage and they don't get it) altogether, in fact if another tram approaches then it gets a hurrycall as well so you might miss stages out for a period.

Qc – page 7 – it says that if a tram arrives at a signal it will get priority – go through come what may from that. The compensation point – if another tram arrives it will also trigger priority in the junction (double priority given)

Gr – the FOI answer doesn't answer the question of how each road gets a fair chance – that can't be done in a hurry call system. We believe that pedestrians get quite lucid to the fact that...they know the junction...they would not accept the missing out of the green man stage for pedestrians [they expect there to be a green man for them at certain times]. Pedestrians often step out on the road when they think it should go green for them, not when it actually does. We don't accept this system – as it is unsafe and increases congestion. We use this to give priority to fire engine vehicles, but when fire vehicles approach we bring the pedestrian stage in early so they can go first. – so this all ties in with the understanding of the sophistication of the STM priority system – it will work so that traffic and peds don't realise there is any manipulation.

Qc – pick up on point of turning counts, your proof at 4.4 – you give us a flow chart. How does that work in terms of the inputs?

Gr- evidence that our junction assessments are appropriate and reliable. The traffic model will be described by Paul Hanson. That model is appropriate model to cover future growth and broad effects of putting ngt in – and how traffic reroutes etc. we have used that model to give us the growth and the overall factors that help us assess what will happen in the future.

Qc- we can see on RHS of page, input going in that is derived from the traffic model. What have we got?

Gr – reason why we go through this process – LMT model gives the strategic overview but it doesn't produce detailed turning counts (it's in its own grouping), it's not at a level where it produces turning movements that are sufficiently detailed. That's why we've gone through this process and given us trustworthy figures in the end. To talk you through it - We've taken junction turning counts all along the routes, those are on different dates, using automatic traffic data - we've used continuous count data to factor the junctions counts we've taken to a standard October figure (October 2012) – reflected by do nothing figures in the appendix – in order to assess what will happen in 2020 – we have factored those do nothing figures up to 2020, we've done that by using the model growth (it has a do minimum run – 2016-2031) – we've pro rata-ed that to give us a factor from 2016-2020 – so we've used that factor to get a factor for 2012 to 2020.

Qc –so that gives you 2020 do minimum flows

Gr – correct. Our effect of the scheme is measured by what will happen if you didn't have the scheme and what the situation would be in 2020 without the scheme – we then had to assess the effect of the schemes on the do minimum flows. We've had to do it at v. detailed levels because the calculations we do need to know exactly what the turning movements are (to do with each junction and make sure we have the capacity for the future situation). There is an assessment here on the right of the page, getting us to the 2020 do minimum and do something flows. Those are then compared to give us the change, using the model here to give us the change in 2020 from do min to do something (the effect of ngt). That has been applied to counts that we have. A couple of further stages done called 'text refinement' – looking at it in a bit more detail to get the final do something flows we used in the assessment.

Qc – in terms of junction capacity - models you used – e.g. transit, signalised junctions, [arkpidy and Pickedy??] etc.

Gr – Arkpidy and pickedy been used for junctions we really are signalling to give us a baseline to compare with although the way they look at the way the junction and roundabouts...despite the difference it is the appropriate tool. Transit is internationally recognised tools for assessing traffic signals. They've been used and they gives us degrees of saturation – a key figure e.g. 100% is the limit...90% has a degree of comfort and somewhere in between is a less good for capacity.

Qc – two aspects of scheme that first demonstrates – lack of confidence of the models. Mr cheek's rebuttal in 5.5 – ottley old road junction and mr cheek picks up on the fact that you say the re-routing identified in the model will not be attractive in the model...he says that you aren't and inspector shouldn't be confident as to the results.

Gr – that's an inappropriate response – the LTM is a forecast of the future – I believe it's a robust forecast of the future and applied this to actual traffic counts to give us a figure to design our traffic signals on. I have every confidence. I highlighted two areas with sig re-routing. Generally ngt doesn't cause re-routing bus there is local re-routing – I'm being realistic there that however robust a prediction is it is a prediction. One has to be aware that the future is a bit more dynamic than that. I'm saying that traffic finds its own level. We've got a route that's quite congested – re-routing traffic will find its own level – e.g. 95% capacity. I'm just saying that we can handle that (our signals are flexible) – I'm not doubting the model, or what we've done with the model, just recognising that there's significant re-routing as when predicting future there has to be flexibility to cater for the future which might not be anticipated

Inspector – you are expecting that people using other routes will come onto that route because they are attracting the signals giving them priority

Gr – not onto the route itself but locally. **Ngt is capacity neutral** (e.g. a660 capacity, not making it worse or better) – but signal's in lawn roundabout is being enhanced and therefore I think there will be some local re-routing.

13/05/14

Inspector – 95% capacity is what is or was?

Gr – page 5 of my appendix 3 – (there is one page for each junction) – [explains what the page shows] – that is 95% - there is always a slight queue at the pickedy junction.

Qc – if you turn over the page and whether you use lawnswood here – you say that you think there will be a sig improvement in terms of what will be done to that roundabout. (doc a11 – the plans) – [puts maps on the screen – page 10] – I judge that roundabout to be v. difficult at the moment – there are no pedestrian crossings, and it's a nightmare for cyclists.

qc - talk about what happens when a cyclist tries to go north at the roundabout

Gr – you have to be v. aware of the speed of traffic and a good gap to get across. You need to be a confident cyclist. Signalling this is one of the plusses the scheme brings to road users in leeds- provides a safe way to traverse the junction. Motorists will find it easier as just wait for lights to go. Cyclists all find it easier. The advance stop line is there so cyclists can stop in front of traffic to be visible. The cautious cyclists are provided with toucans. Pedestrians are better off as well.

Qc – the ngt runs through the middle, doesn't it. Which has the advantage that it runs with the main road traffic – consequently there is no disruption when ngt goes through – it doesn't stop traffic.

Gr – yes there is no loss of capacity or effect of traffic. I think this is a significant improvement and find it hard to think anyone wouldn't appreciate it

Inspector – any reason why it hasn't been done up to now?

Gr – I think it's a very major scheme, a significant costs and the effect, we have signalled other junctions on the other ring road and other areas that are waiting to be signalled. I don't know if I can add any more to that...

Qc – we come to headingley (drawing 16) – what is the existing situation?

Gr – I view headingley as a complete system running from drawing 16 (shore lane) through bypass, to drawing 18-19 where the bypass re-joins headingley lane. This area of headingley is v. congested partly due to capacity restraint in north lane (plan 17) – but there are other constraints. In bound traffic – traffic has long queue on ottley road, there is a bus lane there at the moment. Traffic then progresses, using two lanes (palmer road/in front of Arndell centre) – quite a lot of jostling at the moment in morning peak time – cars moving from outside to inside lane – I'd describe that as quite a congested area. In the outbound direction (plan 18) – we've got a queue outbound along headingley lane that goes back to Victoria road. There's a standing queue here, congestion of north lane and then slow moving all the way up to Laundry avenue.

Gr – plans is the use the signals (of the bus lane) – the majority of traffic will go through to a single lane here towards the Arndell centre. The intention is to use the bus gate to manage traffic at it goes through here. North lane has a capacity constraint – we won't alter no. of vehicles that get through to north lane each centre. But will use a queue system here to make sure traffic doesn't queue up too much. if we could go back to plan 19 – we are doing something similar in the outbound direction – in this plan we have a bus gate (headingley hill where ngt breaks off through the fields) signal here – we will have queue detectors on north lane, this signal will control traffic to the benefit of headingley.

Qc – finally, turn to drawing 21 – hyde park corner. What is existing and what's proposed and what do you think of it?

Gr – this is Victoria road and regents park etc. at the moment Victoria road is not signalled wich means cars coming out of their struggle to force their way into the queue. Hyde park corner is busy and source of queues, the pedestrian arrangement is also not good. 2 pedestrian crossings run with a right turn arrow. They can a short turn once every 120 seconds. This pedestrian is a bit of an issue as runs with a head arrow stage in the inbound traffic. An awful lot of left turning traffic disobeys to

no left turn sign – they get a short green there as well... but that green is often violated [by motorists?].

What's happening with the proposal is that we are banning that movement. They have to do a 'z' – the turning traffic is inconvenienced but the reason we are doing that is two-fold – it does provide extra capacity – so queues at hyde park reduced – it enables us to run pedestrians with a traffic stage. With a 90sec interval at the peaks. This peg will get a green man for about 50 out of that 90 seconds. This will get 15-20 seconds. As soon as one pedestrian green finishes the other will come in. the junction alteration removed traffic queues, and in the process we are providing a much better pedestrian facility – the connectivity there is no comparison to current position.

Inspector – is there any reason why this couldn't have been done without ngt?

Gr – **yes it doesn't have to have ngt running through it to make these changes**. Just to comment on cyclists (tho note in smith's proof about it)- because these greens are long and two stage junction, one route for cyclists is to simply wait here and use green man to cross over there...

Gr – as far as the traffic signals are concerned we are congestion neutral – we are not altering the capacity of the routes as a whole. You wanted me to comment on the council's objective about not increasing or decreasing traffic. We are not restricting traffic – because its congestion neutral there's not a sig change of traffic on other routes (exception of local rerouting on that 'z' lane). Essentially there is no change in the capacity of the a660.

MORNING BREAK

CROSS-EXAMINATION BY GREG JONES

Gj – there was a change in personnel involved in this part of the thoughts for the signalling for the ngt scheme – when did you become involve in the ngt scheme as opposed to your day job of managing signalling for leeds

Gr – I had sideline involvement awareness of the original scheme...From something like 2001 I had a sideline interest in the supertram scheme and I was involved in the ngt scheme as it developed.

There was a change in personel – I became more fully responsible and helped to develop the scheme to its current stage

Gj – a change in signalling philosophy as well?

Gr – not sure what you're referring to there

Gj – different ideas and approaches

Gr – the scheme has progressed and there has been some fresh designs but not a new approach

Gj – the position is that you are familiar with the road network, we are interested in the deliverability of what is claimed as bonuses of the ngt. Is there a published list of junction priority improvements that the city has that you are aware of?

Gr – a wish list?

Gj- I don't know how you structure it. You were pressed by the inspector as to why you need the ngt to do these changes? You said that we've got various junctions and priorities – a general answer you gave. Is there a published list, in the context of the answer you gave to the inspector, where you have identified in an objective way the areas that cause the most problems and priorities it. E.g. is hyde park no.1 or no. 10. Does it exist?

Gr – only list is the one existed for funding for the ltp process. No other list in terms of a wish list for junctions to signal.

Gj – your main job, you are no doubt keen for these junction improvements to come about.

Gr – my job is to do the best for residents of leeds

Gj – if you look at 1.4 and 1.5 the position is that your proof follows on of that of Jason Smith's. it's right isn't it is that the scheme was designed and then you then look at how a junction priority system is to be carried out

Gr – no, it was a fluid process. Though Smith was more responsible for decision making regarding final decisions...

Gj – we don't see anywhere that iterative process that you're referred to of the to-ing and fro-ing of signal design.

Gr – I couldn't point you to it. Actually there is iteration available in the progression of design (e.g. p11 etc.)

Gj – that was frankly, nothing to the credit of the scheme, as late as march 2014 fundamental alterations had to be made because they hadn't been looked at.1.5 – you made clear that your proof relies on the modelling of mr hanson in terms of traffic in the future with ngt.

Gr – that's right

Gj – we'll have a look at the degree of sensitivity analysis built in between the interface of the models e.g. if the modelling is not correct. By way of general introduction its right isn't it so far as the approach has been taken, a lot of the junctions rely on signals from ngt vehicles as they arrive? It's based on predicted dwell times which are modelled and such like?

Gr – signals work whether they get a ngt detection signal or not.

Gj – but if we take infirmary street or places like that, they don't always work – sitting on a red light beyond what is predicted.

Gr – I'm not sure what you are referring to. The infirmary street signals will get a green within a certain time.

Gj – you're not aware then of the difficulties in infirmary street

Inspector – can we look at where infirmary street is on the plan connected to the route

Gr – I presume you are talking about the signals at this end – (plan 28B) – park row and the bus and taxi section. I'm not aware of any problems there.

Gj – ok. Similarly, go to plan 25 – second area where I understand there are problems. Broadcasting House in the middle – the existing situation where buses come down there and it's a bus gate isn't it

Gr – correct

Gj – the buses go through on the green and cars on the red if there's a conflict.

Gr – it doesn't quite work like that. It's not a bus gate in the way we operate bus gate on the ngt route. It gives priority greens to buses but not in the same way. It comes down blenheim walk and past the university – the buses that come down blenheim walk stop at the bus stop just before the bus gate whilst the others don't. in addition that bus gate coordinates with the signals down here...[points] – bus gate coordinates buses that don't stop at the bus stop so they can go through in an empty space....

Gj – you're not aware that buses go out of the bus lane into the car lane to take the other route

Gr – I'm not aware of that phenomenon – bus company hasn't come to us with a claim on that. It's not to their advantage.

Gj – you mentioned Edinburgh tram – 3.6 proof – it says it also uses STM to deliver high level of priority. You don't set out there the various degrees of higher level priority there. Its right that different degrees are planned to be used in Edinburgh, isn't it?

Gr – I'm not familiar with them – although it's using our software. It runs on rails and there is an outer section that relies on the hurry call technique. Some sections rely on the STM system we rely on and some don't.

Gj – the hurry call is akin to the system used in Croydon?

Gr – I guess so

Gj – you were suggesting that mr cheek deal with Croydon. But you suggested that it was using hurry call. Edinburgh uses a mixture including hurrycall.

Gr – just to clarify for the inspector the Edinburgh system is not running (e.g. running on the street but not taking passengers – still in the trial period)

Gj – it will have some impact as you will have to take into account dwell time assumptions etc.

Gj - can we look at 3.9 (inserted 3.12) is where you set out the current bus priority on the ngt routes. From your evidence one sees [reads out the bus priority existing] – that its applied to all buses at the moment isn't it?

Gr – correct as long as their system is working

Gj – (gives a few seconds per priority junction) 3.16 states what is proposed is bus priority will be a lower grade in comparison to ngt priority.

Gr – yes, but it is preferable as to what is happening at the moment

Gj – but it is a lower level for buses from that which exists at the moment. At the moment, whether its late or on time, it is given priority. But under ngt the ngt vehicle will have priority as it will be given priority over buses.

Gr – yes I'm not disagreeing with the facts but I am disagreeing with the value given to it. I don't think making an early bus earlier is an advantage. That's why I think implementing bus priority at more junctions for late buses actual represents a slight improvement over the current situation.

Gj – let's take this in stages – first of all its not the assumption I'm putting to you 'making an early bus earlier' – that may have a benefit if there is a concern about bunching...it may be a priority then to make an earlier bus earlier...

Gr – totally neutral for bunching because it could make it worse

Gj – no, depends where your bunch is coming...

[discusses bunching]

Gj – too glib a statement to say that theres no benefit in making an early bus earlier.

Gr – no I disagree. Its quite likely the one at the back is the early one.

Gj – so it's not that its run will be earlier, its giving them priority at that particularly time

Gr – I see what happens at the Arndell centre when a bus is early and is waiting there to go because he is early [talks about being early as a disadvantage].

Gj – the issue between us then is whether there is any benefit in giving priority to an early bus and whether there is a benefit to the overall run time in helping to ensure it remains overall on time for its run time.

Gj – second point is this – as the matters stand, there isn't a trolleybus. Bus has priority at the top of the order. As I understand under ngt, ngt will always get priority even if you have a late bus coming with an ngt. The 'on time' ngt will take priority over the late bus.

Gr – not always, if the bus is running in the same stage as ngt – they will sail through

Gj – no, I'm focussing on when there's a conflict. My understanding is that the trolleybus takes priority.

Gr – that's right. But you need to have that in context of where that occurs – in lawnswood roundabout buses use the same stage as ngt all the way down to shore lane. We are only talking about those places with conflicting stages.

Gj – your case is predicated upon that necessity that where there is conflict ngt gets priority. Do you set out in your evidence the instances where you have assessed based on predicted modelling, how often that will occur?

Gr – no I don't list places where ngt and buses are running in diff stages

Gj - so when one is looking at impacts on both and assumptions being made. To explain – that obviously has the potential to impact on the attractiveness of particular bus routes to passengers. One of the matters that ngt needs to rely upon is its priority. We don't find evidence where you have carried out for the inspector and First, the areas and amount predicted [the impacts that the lower priority will have] where buses in conflict with trolleybus will come off second best, do we?

Gr – that’s correct. But what I do set out is that buses are better off with this scheme than without
Gj – that’s a leap. We need to see how often and at what locations buses come off second best to ngt and consequences to the bus services. You say ‘trust me, it’s all going to be better’ – we would need to see the impact of ngt and impact on the bus network – we need to get some quantitative and qualitative assessment as to what the impact will be as to the location etc impacts.

Gr – I was in a dilemma as to how much technical evidence to put in my proof and appendices

Gj – have you actually carried out those analyses?

Gr – not as such. I could go through the junctions and give you a list of ones with conflicting stages.

Gj – anyway, that work hasn’t been done and your opinion was given in the absence of that work.

Gj – 3.16 – [passage read out] as matters stand setting aside what technology will be used, I haven’t seen anywhere in the evidence setting out reliability requirement for the message technology to the UTMC computers, can you refer me to?

Gr – nothing in the evidence. The reliability level I would set is the level of transponders guaranteed

gj – we don’t have evidence of the reliability of the systems you refer to in the generics. No evidence about their reliability in terms of operation?

Gr – that’s correct – a lot of things not in the evidence. But its very rare it fails and causes problems

Gj – I’m talking about the new technology

Gj – 3.19 – as I understand it there is a basic level of priority that will be implemented on a majority of signals on the route. do you set out which of the signal junctions this bus priority will apply to?

You say a majority, but is there a doc?

Gr – no there isn’t. I guess it’s less vague as difficulty applies in junctions which approach 100% saturation. Some of that will be worked out in practice when we are designing the signals.

Gj – at this stage, then, as matters stand the inspector can’t find where the work has been done to identify which junctions which will have this form of late bus priority etc.?

Gr – that is something we will do when we implement the system. It depends on capacity, how many buses there are and may well be we can give priority to a late late bus, as opposed to a late bus. We will fine tune it when the time approaches.

Gj – there are a no. of factors that would still need to be take into account. Junction capacity and frequency of buses themselves, you need to know how many buses will be likely to be late etc.

Gr- when we applied bus priority in the work we’ve done, its very much a hands on approach as to what is happening on the street. It depends on the no. of late buses.

Gj – the ultimate thing is the no. of late buses, but that will be influenced by the no. of buses you lay on. Presumably that is a relevant factor as to how you will implement signals.

Gr – yes

Gj – what other factors are there?

Gr – a whole host of factors. Proximity of bus stops to the signals.

Gj – all that work is still largely to be done, isn’t it?

Gr – we normally do that when we do it.

Gj – it’s the timing of that –

Gr – what I mean is that it isn’t a desktop exercise, I’m talking about fine-tuning a system on the street to give the maximum priority with minimum disruption to traffic – needs to wait till the scheme is built etc.

Gj – that’s not right – we are far away from fine –tuning. You’ve got existing capacities that you know, you can speak to bus operators to ascertain reactions, you can then carry out that work.

There is a basic stage before that where you’ve got all this information – you can ask bus companies about refinements on their route – you can carry out the work to get a meaningful impact

Gr – I don’t think the results of desktop exercises like that are particularly meaningful. I would offer the analysis we have done

Gj – whatever you say as to the value of that work – it’s more advanced than the work you’ve done now. You are asking inspector to rely on work you’ve done without any analysis at all of what I’ve mentioned above.

Gr – I disagree

Gj – your evidence is to look at bus priority that city has at the moment – a form of bus priority that doesn’t have to make way for a competing trolleybus – you are saying that is a better way than even just identifying which junctions you will prioritise etc in the future.

Gr – I think real numbers are more important.

Gj – [goes to appendix 4] – this is not a paper analysing what I’ve been asking for – the impact of this scheme on predicted bus priority in Leeds, is it

Gr – correct. What I’m saying is that when you see this appendix 4 and see how it works – you will see that this analysis is of greater value than a desktop exercise where you put your own assumptions in etc. than the analysis we have done so far.

Gj – we are looking at a table showing bus priority in Halifax. Is it competing with any other form of transport? Any other mode of transport that gets priority above buses.

Gr – no. [explains what it shows – shows that the priority system tracks each bus...it’s difficult to see but there is a benefit in that the red dots in generally are lower than the blue dots]. This is the sort of priority that we will be giving to buses. Our system is individual but the reality is that it is better to model it as it is than to model the future.

Gj – this paper supports is that what Leeds should be doing a bus prioritising scheme. You are looking at Halifax bus prioritisation scheme – indeed we see that the conclusions are that bus priority (5-13) overall BCR in a bus priority scheme is in excess of 7.

Gr – yes because cost of implementing bus priority is so low. This shows the examples we can do to give bus priority. It shows there remains a significant element of delay. It is more akin to Scoot system, like in London. You still retain a big element of signal delay.

Gj – there is no reason the benefits identified in this paper, in terms of bus prioritisation, could not be implemented in Leeds without ngt?

Gr – yes, and they have been. As I said in my evidence, we have implemented bus priority across West Yorkshire e.g. Halifax system. We’ve done it on 10 junctions on the ngt route.

Gj – put ngt away, you rely on that by giving reference to bus prioritisation implementation in Halifax and elsewhere, there is no reason why that bus prioritisation cannot be implemented across the whole of what would be the ngt route [without ngt on it], is there?

Gr – and it has been. In 3.9 in my evidence we have implemented bus priority in 94 junctions in Leeds. We chose the 94 in which we estimated there would be most benefit from bus priority – including 10 on the route. What I’m saying is that we have cherry-picked those 10 junctions and have implemented bus priority and there is no room for further improvement without causing further congestion.

Gj – or without giving bus priority the degree of segregation that ngt is going to be given because in terms of prioritisation, any prioritisation brought about for ngt doesn’t ease congestion, does it, its congestion neutral according to your case, does it?

Gr – you asked several things there...

Gr – I was talking about the STM system and saying what we have already done for Leeds - 94 of the best junctions.

Gj - there’s nothing to stop you [putting aside trolleybuses] extending these prioritise to other junctions [roll out the bus priority scheme further] and that would bring transport benefits?

Gr – yes

Gj – the advantage we see with bus prioritisation, it has a particularly good BCR as it is relatively low cost

Gr – yes

13/05/14

Gj – can I go back to your proof 3.20 – you say there that most junctions will have bus priority implemented but some critical junctions not possible. I haven't found identified in evidence what those critical junctions are – is that work to be done?

Gr – yes

Gj – just clarifying, 3.21 – “with the ngt scheme priority will re-enforce scheduled journey time... etc.” that is only if they happen to be there when a trolleybus arrives.

Gr – yes they will benefit if they arrive on the same time

Gj – given that you don't set out, and we don't know yet where bus priority will be, it's impossible to say with any degree of confidence that bus priority will be implemented in sig more junctions and ped crossings than currently as you don't know which junctions bus priority will be carried out

Gr – no, I can say it with confidence – it will apply to all stand-alone pedestrian crossings. Issue is whether we can provide it to junctions nearing 90% capacity.

Gj – it wasn't just the capacity. We listed at least three factors which were an assessment of the no. of buses running, no. of late running buses – that work isn't set out anywhere is it

Gr – yes. because it's not black and white like that, take hyde park for example – the outbound bus is difficult but inbound is easier to deal with.

Gj – it may be difficult but that work hasn't been done.

Inspector – you say bus priority will be implemented in significantly more junctions. You say some already have them...do all ped crossings have bus priority at the moment?

Gr – only two now

Inspector – but you are adding more on, aren't you?

Gr – yes...of the extra ones getting bus priority some will be existing and some will be extra ones added

Inspector – out of the critical junctions, are there any that already have priority?

Gr – no...

[approx. 1 hour in]

Gj – we've got to weight those points in when we examine overall benefit of ngt– in connection with the case made for the promoters in terms of impacts of bus services etc. you say layout changes will directly benefit buses. Just so that I know, do you set those out anywhere and identify those layout changes directly beneficial to buses

Gr – no

Gj – next section, 3.23 as to why bus priority has to be limited – one of the issues is with this system it has three cycles, in terms of the warning, the doing and the recovery. In so far as this is predicted to operate in leeds you say it is very tight so there is no prospect of increasing the frequency the trolleybuses?

Gr – it varies according to junction to junction

Gj – at the critical ones

Gr - at the critical ones, it's a guaranteed that it is tight... its not quite falling over a cliff but there's a degradation in the priority that can be applied.

Inspector – is that at peak, or during off peak or both

Gr – in terms of effect of frequency, off peak could cope with more frequent buses as not same pressure on the junctions.

Gj – what we can't see from your evidence is identification of critical junctions, the tipping point at which you say the no. of vehicles per hour can be given without the impacts – and then any indication of what those impacts are...you say its not like falling off a cliff...but I can't find anywhere an analysis that shows the impacts and how it plays out, it that right?

Gr – that's correct

Gj – what we can't see is whether or not, if for example, one was to (mr cheek's evidence) look at giving at certain times critical areas, priority to even why you can't have a bus priority system or indeed operate a priority system along the lines of the Croydon tram...and the system partly used in Edinburgh.

Gr – you've got two questions in there...my evidence does show why a bus priority system doesn't give you the benefit – as I said we have implemented that in Leeds and you see the figures in Halifax etc. that the bus priority as its currently implemented – the best we can do is the saving of around 5 sec per junction.

Gj – but you aren't comparing apples with apples. In comparing trolleybus scheme and bus priority – trolleybus scheme is segregated. You haven't compared bus priority (rolled out) without those constraints (e.g. the segregation of ngt vehicles in a separate lane) – have you done an exercise where you analysed a bus priority scheme with all the physical infrastructure of the ngt scheme (without overhead cables) such as a segregated lane with the ngt scheme compared to a trolleybus which has priority over buses, and 75% of its route segregated. [one of the comparators is with a BRT – with many of the characteristics of a tram]

Gr – we have not done this exercise which says what time-savings we would give to buses if the buses stopped at the ngt stops and used the ngt infrastructure. You also asked if we've done an exercise using the hurry call – we haven't done that as we would not use this because of safety and congestion reasons.

Gj – no evidence I've seen that sets out these dis-benefits. Is there evidence you can take me to as to why a system akin and application of hurry call or a tuning of STM can be adapted to deal with that. We know in Edinburgh for example there's a blend - where do we find that there will be safety issues of pedestrians 'throwing' themselves onto the road...?

Gr – I don't discuss hurycall in my evidence. Its quite true that they find them acceptable in Croydon. I am just saying we would take a different approach to safety in Leeds. We want to develop this system to make sure that that isn't an issue that arises.

Gj – you've got to when you're going through your analysis, have an analysis comparing whether there are real safety concerns etc.

Gr – I've not seen or done an analysis of the safety issues in Croydon.

Gj – that's not what I was asking...

[inspector interjects]

Gj – no, I've not seen that you have done an analysis of the safety issues in Croydon. My understanding is that no analysis has been done as to whether a blending or different use of priority systems could be implemented in Leeds, having regard to all factors but including road safety.

Gr – that's correct. We haven't done it as I don't think it's possible

Gj – I asked this because you asserted that the reason is because of road safety – but actually the reason is you don't know

Gr – no, that's not right. I think that missing a pedestrian stage is a significant concern and I can see that this is unsafe.

Gj – you've not discussed with your colleagues in Croydon what their experiences have been in that area?

Gr – no – but in 2003 my colleagues did an assessment of system in Croydon – at that stage we did offer them advice.

LUNCH BREAK

Gj – if you don't operate bus priority in full – there is an impact, but we don't see the sensitivity of the impact modelled anywhere, do we?

Gr – some sensitivity analysis in the business case...

Gj – but in terms of signalling impacts, on adjusting STM software if it was not on full? [i.e. a 'dialled-down' version of STM]

Gr – no

Gj – it is possible that you could make adjustments to the STM system, to operate at less than full priority? Would you be allowed to adjust it? E.g. lower the degree of priority (as an intendment)

Gr – for each junction we write logic statements that defines what happens. It's not a dial you can turn down.

Gj – but you can adjust the logic – the software is capable?

Gr – well the logic is written for each individual junction

Gj – yes. As I understand, your analysis is based upon an assessment of each junction individually?

Gr – yes, we have done analysis using transit 15 looking at specific areas. But evidence I'm presenting here is junction by junction.

Gj – that depends on everything working and there being no backing up of traffic along the route, doesn't it. That could impact on the work you've done – which is looking at junctions in isolation.

Gr – I don't think that's right – we will be using queue detector to look at backing up – if there is an out of the ordinary issue then they might get priority

Gj – if we get the march 2014 plans – can we go to drawing 16. You've got the Arndell centre up here – as we come in from the NW there, you'll have two traffic lanes and as they go across the junction they go into one, don't they?

Gr – yes

Gj – so in terms of when you go across, if you've got cars on the other side blocking up and trying to come over – it's already a problem – there's a potential for blocking occurring here.

Gr- its not the same situation at the moment – traffic here is the outside lane, currently it wants to move on the inside lane. With the scheme in place the majority will be heading for the outside lane.

Gj – so you are saying you are looking at off side as opposed to the curb side.

Gr - I see that as an improvement.

Gj – further along near north lane you've got capacity – and traffic coming from north from the capacity junction and also the other sides –

Gr – that's where we said we'd provide sig control, like having queue detectors ...

Gj – that's cus you are predicting you will have-

Gr – north lane is not changing. If we get it wrong, the queue detector will enable us to detect that and let in less traffic through the next cycle

Gj – you're not changing position of the overloading and backing up on the north, then you say you'll have queue detectors, which mean you will adjust the priorities, will it?

Gr – it will mean reducing the green time and also controlling the left turn

Gj – has the impact of that been factored in when you have to adjust the lights to deal with, not with the need of ngt, but this traffic backing up?

G – it's been taken into account of– you see it in the design – that's why we have the bus gate there...

Gj- no, where do we see in your evidence that shows management and reaction of this position – where you will have backing up in the northern route etc. that will have an impact on ngt and bus journey times. where's the modelling

Gr – I'm sorry but you've misunderstood – it won't have an impact on ngt time or bus time, if anything it will improve bus times as I am holding the queue back north of this point on ottley road and the buses will have an easier journey through here

Gj – but you're assuming all the buses run north south, what about the impact on those [not n-s]

Gr –they will benefit from the tidied up arrangement from here

Gj – what's the impact on the journey times? when there's backing up and signalling is being adjusted.

Gr – I'd rather miscommunicated...what I'm trying to explain is that there will not be backing up in those two junctions as I will be relocating the queue to alongside the inbound bus lane [I'm not reducing the capacity]

Gj – you're just moving the queue to another place – you assume that all the buses will be going north south. A queue is being transferred to the east – where is the modelling on the impacts of those bus routes

Gr – I am transferring the queue here but this one goes back to the lawnswood roundabout etc. as far as this bus is concerned that is not affected by the queue being re-located...it benefits from the fact that the situation near the Arndell centre is smoother.

Gj – I see

Gj – there's no where we can go and see what the impacts are

Gr – I haven't got it

Gj – going back then to trolleybuses – dwell times. you made an assessment of how much dwell time there will be at each ngt stop?

Gr – no I haven't

Gj – an assessments been made as part of the promoters case?

Gr – yes in the business case –but as far as I'm concerned all I need to know is that it is predictable

Gj – but it's not is it – they won't always stop for the same amount the time will they

Gr – my understanding is that the variation is very slight – we have the stage 1 line up and final adjustment...

Gj – are you relying on the assumption of your work made by others on these dwell times

Gr – no, when we fine-tune these priorities we will be using real dwell –times

Gj – I'm interested in your evidence in this inquiry – you assume that dwell time will be the same and you assert the variability of dwell times for buses.

Gr- I don't mind if they are longer in the peaks but as long as they are within certain limits so we can predict those journey times.

Gj – let's test it – you say that you're confident. You won't know, even for each bus stop, there will be different dwell times and diff instances, won't there?

GR – it's not always the same, I agree, but the computer can arrange the times to fit the circumstances.

Gj – so how many trolleybuses are being predicted when you've got a variable dwell time. One of the issues, your approach assumes that trolleybuses won't bunch, you think it's unlikely

Gr –if they bunched they would still get into signal but with some delay

Gj – but your evidence, do you accept, that trolleybuses can bunch and that's something that needs to be assessed?

Gr – given the frequency of the buses they will make sure it won't bus.

Gj – but your evidence is based on assumptions that they won't bus

Gr – my evidence in terms of capacity of the junctions – doesn't matter if they do or not. The guaranteed green signal assumes a certain no. of buses every stage.

Gj – one disadvantage of trolleybuses is that they can't leap frog can they? Assume we've got bunching of trolleybuses – just explain to us how the signalling priority works – the late one in front and the other one has caught up. Can they both go through together?

Gr – before they are tail to tail they ... if such an event were to occur – before you would get an ngt on the tail of another ngt It will be 4,3,2 minutes away – the degree of polarity of it at signals would decrease. As this postulated second ngt catches up it would not get the degree of priority at the signals along the route so before you get the tail-to-front ngt line you would not get...

Inspector – im assuming you're saying it won't catch the other one – no bunching them?

Gr – this is a hypothetical situation which I thought the operator wouldn't let arise – just by the way priority works, we would not allow a vehicle priority, there would naturally be something preventing it from bunching up.

Gj – there are other factors that cause bunching e.g. varying passenger load, congestion on sections – no one is suggesting that any operator would deliberately create a bunching situation

Gr – congestion doesn't cause bunching (because they are stuck on the same queue) and secondly, about variable passenger no. – number of doors on ngt means that's not such a significant issue.

Gj – I'm going to put to you that your point on congestion is wrong – you are saying congestion doesn't cause bunching – that is matter that we do not agree with. Your second point is onto the passenger loads – it can only be mitigated not removed just by the design of the trolleybus

Gr – I'll leave another witness to deal with it

Gj – in so far as Haskins comments on the Atkins report – in so far as the difference between trolleybuses and RT buses – loading and un-loading, those issues could only be overcome by the design of buses

Gr – not my area...

Gj – you say if there is an issue of trolleybuses bunching, the system would operate to make the second one go slower. Impact of that is that the journey time of that bus is late? Your answer is that the lights would slow up the second bus to stop it catching the first bus.

Gr – I'm not clear quite what you're saying

Gj – we've got a situation, if you've got a situation where trolleybuses are capable of bunching, the interval between the two trolleybuses diminishing (let's assume) – we've got this coming together, what then is the signalling response to that situation

Gr – as they get nearer, the second ngt vehicle will get less and less priority.

Gj – the effect of that will be to slow down the journey time of the second trolleybus? Right?

Gr – on the assumption that the first trolleybus is traveling slower – then yes I agree.

Gj – can we also note that this is something else not modelled in your evidence or anyone else's [the impact on journey times assuming there was bunching]?

Gr – correct, if bunching could occur

Gj – can I take you to 5.23 of your proof – “talk about ngt turning from park and ride bodington – expected ngt detection system includes etc. etc.” about the right hand turn. As matters stand no decision has been decided as to what will be used for this junction, am I right?

Gr – yes, not yet

Gj – your appendix page 5 of 76 – you discuss this junction – has an assumption been made as to which system will be employed or not

Gr no

Gj – so what has been done

Gr – the capacity of junction is unaffected by what turning is used

Gj – your evidence is that that has no impact at all in the calculations set out in the table in 5 of 76

Gr – correct

Gj – thank you

Gj – in terms of the prioritisation system and the signalling capacity, your evidence, there is a limit to the number of trolleybuses that can be accommodated in the priority system?

Gr – correct

Gj- so the business case is based upon that no. of trolleybuses, isn't it. The effect of that is that in order to get the figures we've got up to 160 capacity of trolleybuses –

Gr – I'm aware that figure is in other evidence

13/05/14

Gj – so far as signalling is concerned, that sets the parameter of the no. of trolleybuses that can be accommodated within that degree of signalling priority

Gr – correct

Gj – the other point to that is for other witnesses, thank you.

Gj – 3.26 of your proof, you say that “bus stops can be located very close to traffic signals etc.–“ along the ngt route how many major junctions are there with bus stops right next to them ‘very close’

Gr – I haven’t counted

Gj – we have looked. We can only find one – it is on Albion street in city centre.

Gr – I’ve already mentioned hyde park on the outbound and one near glen close etc...

Gj – because when you say very near, there’s no proper analysis set out in your evidence anywhere that actually supports that statement that you set out clearly what you consider as very close and whether it effects signalling times

Gr – not set out

Gj – no definition of ‘very close’ is there. Metro is in charge in terms of bus stop location. If this is sensible scientific evidence then we expect the evidence to be set out – those stops set out in writing in your evidence and the definition of ‘very close’

Gr – I hope you’re not suggesting I’m neither sensible nor scientific

Gj – I will be submitting that less weight should be given to your evidence because of the lack of scientific analysis.

Gr – the reason why I don’t define ‘near’ depends on many factors e.g. how complicated the junction is etc.

Gj – how close is the stop to the junction at hyde park?

Gr – I don’t have no. of metres in my mind – on plan 22.

Gj – that’s one example. In terms of ngt trolleybus stop have you carried out similar exercise as to the proximity of ngt stops to major junction priority signals?

Gr – no I haven’t. the difference is that the ngt stop times are much more predictable and therefore places like hyde park where there is an inbound ngt stop v. close to the signals we anticipate being able to give that a smooth green as it moves on from the stop.

[discussion as to what witness does and doesn’t know and what is actually in his evidence]

Gj – can we go to plan 28 – there is an ngt stop right next to the junction here. Is that right?

Gr – yes

Gj – if we see where the civic centre is [circled here on map] we’ve got an ngt stop here right next to the junction here...that’s a matter which you’ve explained you’re confident you have the methodology to deal with them – that will be assessed in due course...the implications for signalling of that junction along with others.

Gr – no, we know the effect on signalling now, we have not written the logic that operates that particular system now... that ngt runs with the park row and we will use the predicted dwell time at the stop to make sure there is a green there for when ngt is ready to leave the stop. That goes back to the comment I made about reasonably certain as to the dwell times of ngt.

Gj – plan 24 - leeds arts college –if we are looking at blenheim walk – as a result of the proposals the trolleybuses and all other buses travelling southbound will be opposed by north bound traffic on the a660 blenheim walk corridor, is that right?

Gr – certainly for the trolleybus and other buses if they choose to move there. Northbound vehicles on this route coming outbound conflict with major flow of traffic coming out there

Gj- that’s currently not the case is it

Gr – correct

Gj- as a result of proposals, pedestrians will have to cross blenheim walk in two distinct movements using an island. Currently they can cross with one movement?

Gr – that's not correct – if I could turn you to appendix 3 page 27 – [explains new scheme being put in at the moment – would have been opened on Sunday if wasn't for leeds marathon] in order to get from college of arts from other side of blenheim walk you have to do two crossings – one shorter one and one bigger one.

Gj –ok...short crossing from the college onto the island, then a crossing across – with the new scheme currently being put in... the inspector will see it when he's on a site visit – you say it's not a one movement but there is still a step change from what is proposed so there will be two distinct crossings brought by ngt.

Gr – whether it's a step change it's a matter of judgement.

Gj – is it mr smith who'll be able to help us with the traffic flows? So far as the pedestrians waiting on central island – can you help me with the traffic flows predicted for the post-ngt scheme in that area.

Gr –which island are we talking about? The one in the middle of blenheim walk? - traffic flows seen on pg 27 – outbound around 1000 and inbound something similar.

Gj – so just in excess of 1000 vehicles an hour.

Gr – it's the same amount of traffic around the junction just a question as to which movement it comes on. The loss to the pedestrians to have to cross a 1000 vehicles instead of a few hundred on st marks is compensated for by the gain in pedestrians crossing outbound – to only contend with a few hundred instead of a thousand

Gj – focussing on what we can agree ... as a result of the proposals – there is currently no sig queueing north bound is there?

Gr – no northbound traffic is there

Gj – proposals will lead to the intro of two way traffic?

Gr – agree

Gj - looking at the transit results suggests the give of 29 vehicles and saturation of 89% - obviously this modelling, you said in your evidence that the limit of acceptability is around 90%? You're looking to do something when it gets in and around 90%?

Gr – no, a660 has junctions all the way along that are at 90% - 90% is target for construction and policy on ... not policy, just the fact of the matter is that a number of junctions along the route are no worse than the system...we can't improve from 100% to 90%...and indeed if we did it would only attract more traffic in from other routes

Gj – let's just step back – 89% and I don't know what levels of deviation for transit results are...how accurate that 89% is... could it be 90%... be that as it may...

[inspector – perhaps mr Robertson can help us on it]

Gr- transit is a mathematical calculation and doesn't have error – if there was a source of error it would be on the flows. Flows outbound are constrained by all sorts of things. I don't think there is a sig degree of error on the flows just because you wouldn't be able to get along the route if it was any higher. The queue has moved from the university to the college of arts – I doubt I would disagree with you on that.

Gj – we're already there then. Outside the college of art, we weren't looked at queues of 89% saturation were we?

Gr – yes

Gj – the location of that queue – is nothing to do with you is it.

Gj – going back to the island and the pedestrian crossings – we've got around 197 people in ten minutes crossing from the Blenheim road crossing island looking at over there – the big island. From the promoters' figures...

13/05/14

Gr – if from mr Wilkins accounts, then I don't dispute them

Gj – 197 people will be crossing on that island – this might be more of a mr smith question. You don't dispute those figures do you?

Gr – no

Gj – is it a question for mr smith as to the advantages/disadvantages in regards to island crossings?

Gr – correct - had you asked about the small islands I would have commented on the green light.

Gj – no, but thank you.

[1.05hrs)

FEDERATION OF SMALL BUSINESSES – CHRIS LONGLEY

Cl – from what I heard you say this morning, one of the key considerations relate to cycle times that are within your calculations, about passage of trolleybuses through the junctions-broadly speaking there is a two minutes stretch which allows a warning of an arriving trolleybus, another 2 min to allow it to clear the signalised intersection, and another 2 min to allow the system to stabilise after it.

Gr – that wasn't quite the meaning I was going to – it is a question of cycle times, in that instance to ensure 20 sec cycle times...

Cl - Is it the case as far as the overall route is concerned the point along the route at which there is the greatest scarcity of cycle time is the constraint on the passage of the trolleybuses through it. The indication I drew was that if there was a 2 min, 2 min, 2min allowance, you would have ten of these combinations of 6 minutes in each hours.

Gr – I don't think...traffic signals are going around their normal cycle times – as the trolleybuses near, we would adjust that cycle time so that when the trolleybus gets close enough we could see it through – exactly what the means depends where you are. At shore lane it's a 120sec cycle time, but inbound 61 sec of green. Three cycles copes with that. In city centre, running at a 72 sec cycle time is harder – don't quite have that flexibility.

Cl – ok a variation on the question, you've modelled 10 trolleybuses an hour running at 6 minute intervals?

Gr – in terms of the saturation percentages I give, that isn't necessarily the case – at shore lane the saturation isn't effected by the trolleybus as it is running with the traffic stage. At lawnswood again running at traffic stage - it doesn't affect saturation. There are one or two areas where it does – e.g. south of lawnswood where ngt is joining the main road – the junction that goes off to the conference centre. There the ngt stops everything (inbound to come out) – there I've taken the trolleybus green stage and calculated the effect of that – but it doesn't have effect on the capacities of most of the junctions on the route

Cl –presumably the reliability of the frequency of the trolleybuses is affected by the worse junctions – because you've only got 20 vehicles and what goes up must come down. The constriction on the ... is the worst performance of the worst junction

Gr – the trolleybus delay...obviously the junction at the maximum delay for the trolleybus - that probably occurs where we've got a change in cycle time ... e.g. hyde park, st mark's is on the 72 – probably the worst delays where we are trying to match the trolleybuses from one cycle time into the other –

Cl – what I'm trying to pcik out is have you done a test of the sensitivity and reliability of the overall traffic management system – that establishes the max no. of trolleybuses that are possible to run

and not have the rest of the traffic signal system fail. how sensitive is the traffic management of the corridor to the no. of trolley vehicles that are running reliably.

Gr: in the vast majority of cases, it would be the trolleybus that would suffer delay if we were upping no. of trolleybuses to 20 an hour or something – it would incur delay but traffic would be unaffected.

Cl – have you been able to establish the extent of that delay because plainly the business case relies on the vehicles delivering the time saving reliably and predictably to the intending passengers – if they are caught in some kind of sequence of cumulative delays or otherwise...my learned friend was looking at a similar issue... I'm trying to establish at what point, e.g. 11th 12th trolleybus per hour, at which the reliability of the service effectively fails as the frequency is no longer manageably reliable.

Gr – it wouldn't fail like that... if you take the case I mentioned just south of the lawnswood roundabout where ngt enters main road and it is a pedestrian cross and in weetwood hall area – what I assumed there is that ottley road alternates with something: Either weetwood hall (not a lot of traffic output) or alternate with the ngt on a 90sec cycle time to match lawnswood. When ngt comes out and if anyone is waiting at weetwood hall they would have to wait till next cycle to come out- on that reckoning at a 90 sec cycle time, you could cope with quite a few ngts till you hit a critical period where you say 'actually we can't alternate because we alternated last time

Cl – in those circumstances, what would happen with the rest of the traffic?

Gr – I would keep the a660 free...assuming ngt goes above 20 because 90 sec cycle time is 40 cycles in an hour...I would then delay ngt if there was a vehicle at the same time at weetwood hall – because I don't want the traffic to queue.

Inspector - is your answer around 20 vehicles then?

Gr – it's not quite an answer, as I was saying I wouldn't let the traffic around lawnswood roundabout

Inspector – so 20 may be the answer you're getting

Cl – I'm trying to establish how robust and sensitive the frequency of the trolleybuses are... I'm trying to discern from the available information.

Inspector – we have explored that one...maybe move on...

Cl – what I'm concerned about is that in the circumstances you've defined, how soon after trolley 1 would you allow trolley 2 to go through that sequence of vehicles.

Gr – at that particular junction

Cl – the one with the worst case potential for obstruction

Gr – that prob is the worst case – lawnswood roundabout significant. I would delay ngt there if it was more than once every cycle – more than 3 minutes – so around 20

Cl – so can we take it then that the practical limit of the no. of trolleys that can run and maintain reliability is actually 20 vehicles one hour – so they don't all end up at one end.

Gr – that wouldn't occur on shore lane or hyde park , just that particular junction, if ngt was less than 3 minutes behind then that would occur a delay... It would mean ngt is a few seconds late.

BREAK

PETER BONSALE'S CROSS-EXAMINATION HERE (NEEDS TO BE CLEANED UP AS NO AUDIO AS OF YET)