12 June 2014

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10:00

Cross-examination of Mr Hanson

MW	It's Day 23 and the inquiry has resumed [10:00]. Anything I need to be aware of?
GJ	We've put in FWY126 - an update on PwC report on the mayor of Wellington's visit to China to test electric buses. And FWY125 which is a response to Mr Chadwick's note on overcrowding.
PB [Peter Bonsall]	Yesterday I asked PH if his output fed Mr Chadwick's model and I would like that to be clarified -just a "yes" or "no".
NC	The answer is "yes"- Sir, it's plain from the documents that that is the case. Hadn't appreciated that Prof Bonsall needed to know that right away and was going to deal with it in re-examination.
MW	If you're no really sure you must say so Mr Hanson.
B	We were looking C-1-3 2 page 29.para 4.2.1.1 - bulleted list. Penultimate one is inconvenience on crowded transport. The LTm applies a factor for crowded ral service?
PH	Correct
B	Fixed or variable?
PH	It varies
B	No representation for crowding on NGT or buses?
PH	Correct.
B	Assumes everyone can always get a seat and get straight on?
PH	Correct. It doesn't change.
B	So the reference to a parameter for "crowded public transport" isn't quite right and should read "crowded rail"?
PH	Correct.
B	So I assume the lack of consideration of crowding on buses and trolley vehicles is because you don't have any representation of their capacity in the LTM?
PH	No - if it will help I'll take you to docs describing the development of LTM. C-2-8, p.22 a discussion which explains the reasoning of why we have chosen the representation we have. Broady the bus operators do respond rapidly to market conditions and we would risk underrepresenting capacity whereas for rail they cannot respond as rapidly.
B	Your representation of capacity on buses is that it is infinite and there is no constraint on it?
PH	There is no constraint on capacity. But we consider the implications.
B	That's tied up with why you don't represent capacity.
	E-22, page 5, para 2.2.2. Mr Cameron asked you to confirm that quality factors were to be included. Read out the penultimate one. But please read out the following one?
PH	Crowding.
B	You don't have crowding?
PH	Corect but we have a sensitivity test.
B	I'll come to that.
	Para 2.2.8 p.6 - says loading factors
PH	Representation of perception of…crowding in local transport models is represented as how people perceive time. If crowded withy others you perceive the journey as less pleasant and so you apply a penalty.
B	That's not what it is. I'll suggest it is the ratio of the no of passengers to capacity- spaces

	available. From that you deduce how crowded you are, and then you apply a penalty and work out how unpleasant it is?
PH	Correct.
B	You don't calculate capacity?
PH	There is a measure of capacity but we don't calculate a loading factor.
B	You can't do so because you treat capacity s infinite.
PH	I don't think it is infinite
MW	In effect you cannot calculate a loading factor?
PH	There is a measure of capacity but it is not used to calculate a loading capacity; not internally in the model.
B	E-3-17 and para 6.4.1- should consider degree of crowding.
	G-4-13, page 18. Produced by AECOM for Dft and provides advice.
PH	Correct
B	Halfway down the second para on page 18. Discussing relative importance of different elements of bus quality- seats, real time info. Says "seat availability has the highest value in every study in which it appears"?
PH	Indeed.
B	What do they mean by that?
PH	[sighs]. Sorry the report here is not one I've contributed to so I'm interpreting it at face value. The language is clear- availability of seats and ability to board a bus is important.
B	And in studies of perception of bus quality, that's the most important.
PH	Yes.
B	A comprehensive study that looked at other studies. So it seems that though there is a strong steer from DfT and a study from your own company has concluded that ability to get a seat is the most important factor, you have not included a measure of ability to get a seat or get on the first bus.
PH	The reasons are set out- not how operators respond. I agree I haven't done it.
B	Your definition of generalised cost assumes that all passengers can get on the first trolley that arrives?
PH	That's correct.
B	Waiting time is based on the average wait time for the first trolley vehice?
PH	Correct.
B	About 3 mins.
PH	Correct.
B	If the capacity was not sufficient to get on the first vehicle, the wait would be another 6 minutes for the next vehicle. So average wait would be 9 mins.
PH	Wait for the next vehicle.
B	And perhaps they might consider that they would not be able to get on the trolley and not bother...but we don't need to speculate but if the capacity was not right thn average wait wouldbe higher?
PH	Yes
B	You have to have enough space on the buses for everyone to get onto the first bus?
PH	That is the case in the central case.
B	Is, or is assumed to be the case?
PH	*Is* the case.
B	An important factor?

PH	An important factor.
B	NWLTF114. Some graphs. If we look at the 8 o'clock to 9 o'clock bus flow. Taking the top graph for Woodhouse Lane- the line for bus occupancy. We're looking at teh fact that the occupancy at hour 8-9 o'clock is much higher than other times?
PH	Correct
B	Numbers of passengers is 1450, then 500, then 1200?
PH	About right.
B	To get from ratio of highest part to the rest we establish that occupancy is 1.38x higher than the average hour?
PH	That's right.
B	C-1-8 page 37 table - shows southbound boardings. Table 53 inbound southbound flows and we look at the umber of passengers on the trolleybus at different points on the route- column called "flow".
PH	Correct.
B	Now the flow at Hyde Park Corner is 1053. Not the busiest one. This is for the average hour in the peak. So we multiply by 1.38 to get the number?
PH	Assuming the same profile but that's not unreasonable.
B	Multiply by 1.38 we get 1453.
PH	Difft bits of the peak hour are busier than others?
B	Yes
PH	I the trade it's accepted that the busiest 15 mins is usually about one third higher.
B	It will depend. I would look at the data in the corridor in more depth.
MW	What's the likelihood of that beig right?
PH	Im not going to say.
B	I think First can help they have told me their data is abut 1.27.
PH	They'll have the best data.
B	That figure, it's 1845.
PH	The busiest hour in the peak.
MW	What's this?
B	The graph is the no of people on a bus.
MW	No units in it.
B	I used the graph to get the ratio of the business . It's the number of people who are on the bus, on buses in each hour.
MW	So the number 1845 would be the number of people on a bus each hour?
PH	The forecasts I produced were an average over a 3 hour period. The first step is look at the busiest hour within that period. Then the question is looking at the numbers on the busiest bus in that hour.
B	We're not using numbers from that graph, only using it for the ratio.
MW	You are assuming that it's at the highest 15 mins applied over the whole hour.
PH	It's notional.
B	Yes there are 11 buses in that notional hour and we can't divide that by 4 to give it for 15 mins.
PH	That's not my understanding. By understanding is the intention is to operate 10 buses per hour plus some additional services to accommodate additional demand.
B	We went through it with another witness. 845/11 is 167, more than the maximum you can get on the trolleybus.

PH	Not quite appropriate as that 1 bus would come in the 15 minutes [i.e. 4 over the notional hour].
B	That's not the "high growth" case.
	It looks like we can't afford to provide trolleybuses with less than 160 seats.
PH	You would commission buses in line with the demand.
B	The journey times drop off the more buses you put through every hour. The business case says 11 buses in the peak.
PH	Your division by 11 overstates that as the extra one would come at the busiest time.
B	What you haven't factored in is that the demand might be higher than your central forecast. Sensibly you'd look at the numbers and say 160 was just about right and you're not going to go for only 140. Because you've got to commission the vehicles in advance
PH	I'm not disagreeing with the points you're making but we're moving beyond the area where I can give advice.
B	Wouldn't have a fleet with some 140 or some 160 because it would increase the costs considerably?
PH	I would imagine so.
B	If we go to Mr Chadwick's APP108- looks at crowding with assumptions of what vehicles would be purchased. I suggest NGT3
PH	I've not been involved in the design of the vehicles.
B	Not necessary. You'd agree that o teh basis of your forecasts NGT3 would be what it would be?
PH	The forecasts are not aligned with demand but they are consistent with that.
B	We're shown that 30% of passenger hours are for people who are standing. And a study said that's an important factor, and a study saying it's important. Lack of representation of ability getting a seat or getting on a bus is unfortunate.
PH	I've done a sensitivity test.
B	Not the Q. A risk, certainly if there is a smaller vehicle, of not getting on, and standing, so unfortunate.
PH	I did a sensitivity test and the effect was small.
B	You mean you were given a factor for overcrowding and with that factor the effect was small?
PH	That's correct.
B	I'll address that later - the wrong factor.
B	Is a vehicle penalty applied to trains?
PH	I'm sorry I can't remember - the focus of the work was on this corridor.
B	It's important for that to be ascertained.
NC	Representation of quality factors - are they applied to train?
B	No- penalty "other transport" b=penalty of 5.5 mins is applied to bus- is it applied to trains and other public transport?
NC	I'll find out.
B	Mr Cameron asked why in C-1 table 12.4 you'd lumped together active modes with car. You replied it was for simplicity to avoid having t disaggregate.
PH	I suggested there would be more processing and we didn't have time to do it.
B	I would say cynically that it disguised the fact that active modes were pedicted to fall?
PH	Not the motivation. There was an extra step to separate the 2 numbers.
B	If you start out with 2 numbers, then it's an extra step to add them together.
PH	It's the way the data is held in the model.

B	Can you show us any presentation of forecast for active modes in the 2014 latest business case?
PH	I'm not aware there is one. I don't know.
B	Fact active modes were predicted to fall wasn't easy to spot?
PH	I don't know.
B	If someone can say that it does exist, that would save some time.
Gj	We can't find it.
PH	It was certainly clear in the previous docs.
B	The decision not to include it wasn't yours?
PH	No. If I'd been asked, I'd have done so but I'm not aware that there was a conscious decision not to put it in.
B	No accurate representation of the generalised costs of active modes?
PH	That's a simplification.
B	NWLTF-114, page 1. An excerpt from TAG Unit M2. This is part of guidance discussing whether or not to include active modes. Says "may be special reasons for examining active modes- schemes on radial routes in urban areas with high cycle usage"
	Given the degree of walking and cycling in the Headingley Corridor and importance of providing facilities for cyclists in the design, you should have represented these in looking at mode choice?
PH	It is represented because some of the factors like public transport can be influenced by its presence and there are other ways to assess cycle provision - not the whole picture.
B	You accepted it was a synthetic model
PH	It would be unsuitable to rely on it to design for cycling.
B	Could have been better to have a better model you could have more confidence in?
PH	It's not necessary to model it to incur the very large expense and collect more data to model it in detail.
B	It's not fit for purpose of designing a cycle scheme>
PH	For looking at detailed cycling provision - of detailed cycle lanes within the corridor. But nor has it been used for that purpose?
B	Is there another model that's been looked at for this?
PH	There is guidance that's been appraised.
B	Is there a model that tells us if "this is what happens if you haven't got a cycle lane or it's this many metres or that many metres"?
PH	That's not what I've done.
B	C-2-6 you explain that the choice models are incremental models.
PH	That means they represent change.
B	Seek to predict changes in the status quo as a result of changes in the generalised cost?
PH	I wouldn't disagree with that.
B	The 2014 "do minimum" forecasts were based on changes since 208?
PH	Correct.
B	Car costs, fuel costs change?
PH	Yes C-1-8.
B	What about the quality [enalty?
PH	An assumption that bus services improved.
B	The cost penalty reduced when you were modelling 2016?
PH	Yes, but not quite as simply as that. The most impt element of th forecast is the

	dofferential between NGT and bus.
B	I'm talking about "do minimum"
PH	Most impt element of the orecast is the differential between NGT and bus. We have not represented an improvement in bus travel in the "do minimum". Te inference is we may have understated the use of bus in 2016.
B	So in "do minimum" the cost penalty did not change from 2008 to 2016?
PH	Correct.
B	So the stop changes that Mr Henkel told us about, improvements in bus stops not allowed for?
PH	Correct.
B	So a pessimistic view of what bus forecasts are?
PH	Correct.
B	Has not got correct
PH	I started by saying that the differential is represented. There is an understatement of the growth in bus usage but only of theorder of 1 or 2 %.
MW	What about other penalties like ticketing penalties?
PH	We've assumed it would be the same.
B	You haven't allowed for the improvements that have already happened?
PH	Yes I've already answered the Q - haven't made an allowance for the changes.
B	So he do-minimum is a representation of what buses were like in 2008
PH	Service patterns and fares changed.
B	Not vehicle quality and service quality. Frozen through to 2031.
PH	Yes.
B	You say it as if it doesn't matter, I would suggest it does matter.
B	Qs on the highway assignment model. Fig.8 of C-1-3, page 28. Just one word: "SATURN". This is the model on highway route assignment.
PH	I's used for 90% of urban transport models in the UK
B	Predicts how traffic routes itself throughout the network and how it would re-route, and how delays would build up?
PH	Yes.
B	I want to explore which features of SATURN were turned on and off. First, are the green times figures of Mr Robertson used to define turning capacities of junctions?
PH	We do use those figures as inputs. There's also an element of judgment.
B	Are you representing flow metering?
PH	We are using flow metering. If traffic approaching cannot flow through a junction
B	If you represent queues do you use horizontal or vertical queues (i.e. Showing that they would back up down the road and affect other junctions)
PH	I'd need to check?
B	Does your version include "blocking back"? The horiontal queue?
PH	Yes.
B	So it will cause a problem back upstream?
PH	Yes but my difficulty is I don't work on one job. I'm *almost* certain. Would want to check the parameters. Blocking-back is represented.
NC	Can I ask Mr Hanson to check?
PH	I'll confirm it in the morning.
B	If the penalties are too pessimistic SATURN will overpredict delays and rerouting; and vice

	versa?
PH	Evidently
B	Mr Robertson said green times had not bee adjusted to provide for green time to avoid blocking-back.
PH	I wasn't there.
B	You were using a higher green time because Mr Robertson would have been using his skills?
PH	If that were the case.
B	If that were the case your model would have understated delays?
PH	If that were the case.
B	Mr Robertson's model adjusted for expected pattern of flows but will change depending on what your model predicts?
PH	Correct.
B	Using green times predicted by Mr Robertson produced different green times to those used
Ph	We interpreted them in order to ensure a consistent representation of the network.
B	What did you look at in order t say "ok this is consistent"?
PH	The final check was the journey times on the corridor.
B	The whole corridor?
PH	The delay as it traverses the route. Between the inner and outer ring road for example.
MW	We need to know whether you mean the whole route of the NGT?
PH	No, northern and southern sections considered separately.
	From the outer ring road to the city centre.
B	The key indicator you look at is journey time up and down A660?
PH	That's the final indicator.
B	If it's consistent with the delays predicted by Mr Robertson then you say that's fine and there's consistency?
PH	That's simplified. I'd want to be satisfied that delays were broadly in the same locations. Obviously there are 2 different models. We looked at indiv junctions and we were not trying to match the models to the second at each junction.
B	What about if the problem was on the side roads?
Ph	We looked at the corridor including the side roads.
B	TWE did you look at what was happening on the side roads?
PH	We looked to see that the scale of queueing was comparable. The degree of tolerance was higher.
B	So main check was journey time along A660 and you looked with less precision at the side roads.
PH	Yes. But I think I've been clear that the model will not give precise answers at indiv junctions.
B	What I'm trying to pursue is how much difference is sufficient at indiv junctions to make you think there is a problem?
PH	It's an area of judgment.
B	Mr Robertson said the difficulty 'was zone size and you are saying also that we can't look at detail.
PH	Not able to look in detail.
B	Not able to look in detail on side roads. [PH: There is a tolerance.]

MW	Yes but how big is the tolerance?
PH	Yes it's not suitable to look in detail at side roads. I would not use the outputs to look directly at indiv junctions. It will indcate the direction of change broadly and the broad scale for scheme assessment on the side roads?
B	What do you need for scheme assessment?
PH	There is a tolerance.
B	What error would be intolerable in the side roads- would you use DfT criteria?
PH	The question is one of materiality. If the scheme had substantial impacts on side roads we would need to assess them; if no the tolerance is less.
B	Let's move onto trafic flows. We looked at the table in C-2-9 on criteria for acceptability. You described validation of your 2012 mode against data collected in 2008 or 2009.
PH	Are we talking about the 2013 model?
B	No 2012 as it's a C2 document?
Ph	Ys it would.
B	Can we turn to C-2-9 . Figs 12-18 "flows and journey times" . This is the summary of the tests to see whether the model was reproducing observed flows?
PH	Yes this is the model as it stood 2 or 3 years ago.
NC	To be clear, in XiC we used C-1-3.
MW	This one's been adjusted?
AH	There were concerns that the highway assignment model was not adequate and we made changes to it.
B	Are the locations at which you did the test the same for 2013-14 model as for the 2012 model?
AH	There is a little bit more detail in the 2013 model.
B	Figure 1 on Page 12.
MW	[I'll adjourn for 15 mins] [11:37].
B	[11:50] C-1-3: Not many boxes on the diagrams.
PH	Those are the locations.
B	Can we go to C-2-9 for screen-lines. Fig.9 on page 20.
MW	Sory, what are screenlines?
PH	One of the tests in developing models is whether the patterns of movements are correct. Screenlines cris-cross roads to understand the directions people are moving.
B	Like setting a fence a cross and seeing whether people cross and how many do it. I'm struck by how the screenlines report other points that are not reflected. Were other locations looked at?
PH	Yes- with Mr Cameron we went to them.
B	The tables show "PASS/FAIL"?
PH	But the appendices show the numbers.
B	So if I wanted to know I'd find it in the appendix to C-1-3?
PH	I believe so yes.
B	Are there any other points not shown on Fig.9 where you observed the ata?
PH	I believe that's it.
B	Youare not able to pick up the cross-flow in Headingley?
PH	I agree.
B	We don;t know what's happening in terms of performance of the model - Meanwood to

	Kirkstall (NE-SW across the corridor)?
PH	I agree; there are limitations with the data
B	DfT expressed some concerns in 2012?
PH	We expressed concerns and they agreed.
B	Now you've done adjustments and you are happy?
PH	We made adjustments and I'm...satisfied.
B	What adjustments would you make to give the outputs you want?
PH	As an example, look at precision of centroid zoning and correcting errors.
B	Things like the capacity of a turn movement?
PH	Yes.
B	What else?
PH	Those are the main ones-
B	Capacities of partic movements?
PH	Yes.
B	Does it represent interactions e.g. If traffic wishing to trn right across an opposing stream?
PH	The ability to pull out is represented.
B	If the opposing stream is very full, the right turn is more difficult?
PH	Correct.
B	You might adjust that?
PH	People are willing to pull out and a representation is made.
MW	What about where there is a queue and they let people through?
PH	It doesn't expressly represent that but there is a representation in the inpts so where there is a heavy flow a smaller gap between the cars will be input.
B	You could adjust the model to change the gap acceptance?
PH	You would consider to see what could be adjusted.
B	You'd change things, see if it made broader it would work, but some things you wouldn't be able to correct?
PH	Yes.
B	I would term that "Recalibration" rather than validation as you are adjusting the model. Do you agree?
PH	It's calibration.
B	Well calibration would be the original adjustments and then modified?
PH	Well, second phase of it.
B	The distinction between calibration and validation is that validation must be on an independent data set (otherwise obviously it would work on the set it was calibrated on)?
PH	I agree with the principle. How the data is used has a bearing, where the data is not fed into calibration...I was going to point out that journey times are not input.
B	The observed delays come from the same traffic as you observed so a circularity.
PH	The observed delays were not input into the model.
B	I accept that, but it's not an independent data set because the delays were an aspect of the same data set.
PH	There is...I wouldn't point to separate slows as independent.
B	Strictly speaking there hasn't been validation?
PH	A sequence. Calibration, validation on indep data and then recalibration.
B	Well the document on guidance of TAG Manua says after you get to 6 years old you would

	need to revalidate.
PH	It's a question I would raise in 2 or 3 years but that's not relevant today. In the forecast work done last year, the data was of an appropriate age.
B	It's coming to the end of its shelf-life
PH	If we were doing it in 2 or 3 years we would ave another look at the data. But not required now by the guidance.
B	Have you looked at cross-flows and parallel routes other than is set out here?
PH	No, and there aren't observed data for all such links.
B	So some of the key rat runs, you haven't got data on?
PH	I'm not aware of any such data no.
B	If there were some, you would be aware of it?
PH	I've sought to collect a dataset representative of travel along the corridor.
B	Local traffic and rat-running was a reason for starting this project.
PH	I've answered.
B	OK you don't have it.
B	APP103, page 6. The road coming dow N-S is Beechwood Lane. And road disapearing to bottom RH corner is Moor Road. Strange pair of numbers because the reality is that the dominant flow o Moor Road is towards rather than from the South-east?
PH	I would agree it would be reasonable o expect the flow to be towards the town centre.
B	It's a fact. The figures tend to be 350-400 heading towards the SE (not 50) and 170 or so from the South-east. The figs are very different?
PH	I would agree. But the traffic is predicted to route around. There is an error in the model.
B	If someone said this was an important link, what would you do to improve it?
PH	We would look at the flows at Shaw Lane, Otley Road junctions and how those are represented.
B	Have you looked at it?
PH	The left turn is overstated.
B	The right-turn- an unusual 300 coming out of the city. Instead of coming out and turning right, you model is saying they will go up Moor Road?
PH	Yes
B	Have you checked the representation of Shore Lane to check the representation of flows is correct?
PH	Te flows aproaching Shore Lane are within tolerance. The detailed turning movements have the errors we are looking at. Totals going west along Shore Lane is okay.
MW	You said LH turn is overstated.
PH	Sorry, we haven;t reported details.
MW	Rather than Shore Lane, read Otley Road? Is that the answer to the Q?
PH	No, I'm sorry. My answer is, we haven't reported info on the traffic approaching Shore Road from the Shaw-Lane-Otley Road juncton.
B	How well do you match reality?
PH	I've looked at it but don't have the info in front of me. Need to check that...
MW	Don't answer it without knowing.
B	Weetwood Lane is in the scheme of things more important than Moor Road b/c it is one of your screenline points. You've predicted a flow southbound on Weetwood Lane of 250. The reality is, in the morning peak, it's about 700.
Mw	When you say that, where does that info come from. Is it in any of the documents?

B	There have been a series of studies. I believe John Griffiths has them as an appendix.
MW	If you're going to be quoting these figures we need to be producing them where they are in the docs.
B	Yes. It's of that order and approx 350 turn into Moor Road and approx 250 go straight down Otley Road. Do you have the data on this?
PH	No.
B	Why do you think
PH	Would be turning down the roundabout or down A61 to go into central Leeds. Again this is a question of routeing on local junctions.
B	You will appreciate that for local people this is important to them but your model cannot be expected to answer them.
PH	Yes there are local inaccuracies.
B	Page 52 of APP103 I think has data on Shore Lane. Node 2153. Shaw Lane. And if we turn to Mr Robertson's Appendix APP6.3, page 17. If we compare the observed turning movements with the predicted ones on page 52 of APP103.
PH	The flow observed turning right at Shaw Lane is 160. The predicted count is zero.
B	This is a scenario where the future traffic is forecast to grow and the prediction is zero.
PH	This is a level of detailed local modelling that the mode does not go into.
B	This is an important junction for NGT, Shaw Lane. Important for NGT to get right.
PH	What is needed are traffic flow inputs that can be interpreted and used to design the junctions. The information is available and has been used for this purpose.
B	The proposal is to ban a right-turn into StAnn's Road. Can we look at the observed turning movement and the prediction turning right. The black 11 is Mr Robertson's and 150. We don't have to rely on other data. This is your data. Mr Robertson says the 11 is so problematic it should be banned but your model says 150 and you do nothing.
	You've got the gap acceptance wrong. If 11 vehicles could cause chaos, 150 would cause the junction to come to a halt and wouldn't work.
PH	You are looking for a level of detail that we can't have. The outputs of the model are not accurate enough. I would not use them for junction design but they have not been us ed for that.
B	One of the interests is what the low is going to be - how they will get from A to B and the impact of NGT how they get from one side of NGT to another. Doesn't do that.
PH	I disagree. It does represent the delay but not in the level of detail you are allowing for.
MW	Do you accept you haven't modelled it correctly because you didn't have the right gap acceptance? Do you accept that?
PH	There are other possibilities.
B	We don't need to go there - the point is, there is something wrong because he junction couldn't work like that.
	I your opinion, can we use the NGT forecasts to examine the effects of NGT on local roads?
PH	If trying to look at precise no of vehicles on local roads, no. If trying to look at broad scale and direction, yes.
B	We don't *have* a model for local flows.
PH	If you are asking about single roads with low flows, not sufficiently precise to show whether 500, 600 or 700 vehicles.
B	Page 16 of APP-103A
MW	Moor and Weetwood.
B	The interesting thing about Moor Road is that impact of intro of NGT is that nobody goes along Moor Road in the main direction and more people (350) going in the direction they don't do in reality. Suggests increases he flow in a contradirection by up to 350. Do you

	agree with that?
PH	The same discrepancy.
B	It's got worse. Currently the reality 350 going to SE and 170 from SE. The prediction is nobody will go towards the SE. Do you believe it?
PH	No.
B	It seems as if we can't take any of the numbers and do anything with them. We can't believe them?
PH	We're looking at traffic routing down Moor Road rather than Shaw Lane. The total movements have been represented and the interpretation of the movements for the design of Shaw Lane has been considered.
B	The zero has nothing to do with Shaw Lane?
PH	The model puts them through the Shaw Lane junction.
B	You think, coming from Weetwood
PH	The traffic...
B	This is a strategic problem.
PH	This is traffic using a local rat-run.
B	No, the 700 have disappeared, where are they?
PH	On the roundabout.
B	They can't because it's congested.
PH	There are limitations and we've discussed them.
MW	Adjourn till twenty-to-two. [12:45].
MW	[13:40] We've received FWY115
PH	I haven't been able to find what version of SATURN was used but would have to speak to my team.
NC	We will produce a piece of paper.
B	I had referred to some data from John Griffiths- it's in his OBJ-728 and in his Statement of Case. It's appendix 1. I got the flow wrong -not 750 but one thousand and something - so the discrepancy is even greater.
MW	Let me check I've got it. Yes. When you give your own evidence you can confirm what evidence you were using.
B	What were you referring to with interpretation of SATURN model.
PH	What Mr Robertson did.
B	His jugment of whether there was a good fit between what he observed and you did?
PH	Yes.
B	Not about whether your flows reflected what was on the local netwrk?
PH	No.
B	D you know what the average length of trip (distance) and duration on an NGT vehicle is? [MW: which? The whole? Might be difficult? After what the model predicted?] [Yes].
PH	Not off the top of my head.
B	What would you guess?
PH	I'm just looking at the flow profile diagrams to give me a perspective. We're probably lookin at 4,5,6km journeys for an average.
B	And the duration?
PH	I don't know.
B	Is there another source that would give us a more precise number?

MW	Can I just question that as I was led to believe there would be trolleybuses along the whole route?
PH	Some will only run to the centre and turn round.
NC	Sir, the question was about passenger journeys not the vehicle journey.
MW	Oh. Passenger journey.
B	Is there a source?
PH	I'm not certain whether that average has been reported.
B	I would ask for that to be found.
NC	Average length and duration of passenger journey-I'll try to find out.
B	Now the parking model. Lets go to C-2-6.
PH	Presumably C-1-3.
MW	Yes- I'm assuming it was updated.
PH	The table has been substantially updated.
B	It was a particular quote that I was going to. In C-2-6, we have p.57 conclusions. Penultmate para says, "LTM contains a parking model". Is that still true?
PH	Yes that relates to the twn centre and would still be true.
B	But not for P&R.
PH	Yes, if there was a policy to reduce workplace parking in the town centre it wouldprovide appropriate answers but if we were trying to look at a single car park it would not be suitable. Says something similar inC-1-3 p.46.
B	In C-2-6 it says suitable for "set of P&R sites" but not suitable for assessing single car parks. Is that still true?
PH	In terms of the town centre yes.
B	Is it all right to P&R
PH	The data set we've built on is relatively limited and would attach relatively high uncertaity to those outputs.
B	OK with some caveats to assess demand for an individual P&R site?
PH	Forecasts that are apropriate. I wouldn't use it to forecast say 800 or 900 spaces which is too much precision but for viability for which there would be less detail it would be ok.
B	If your forecast was 800 what range would you put on that?
PH	I would have confidence between 400 and 1200, plus or minus 50%. {N.B. CHADWICK]
B	You draw attention to rather large alternative specific constants.
PH	When we have taken account of all the elements of generalised cost we can understand and measure there tends to be a residual preference for one over another. ASCs are an expression of that generalised preference,
B	I would say, "Adjustments to the generalised costs that hep to bring the predictions closer to reality." Makes up for the fact that the model doesn't represent all aspects of behaviour and makes up for all the things that we do not understand about.
PH	I don't quite agree.
B	C-1-3 p.43 bottom of page you give another definition: "will also to some extent compensate for weakness es or inconsistencies in the input data".
PH	Yes and also factors like security, accessibility etc.
MW	This is to give a greater correlation to the actual figures, what you observe to be happening.
B	How large are ASCs for Bodington and Stourton?
PH	The ASCs are as calibrated for Garforth and...
B	You've used the ASCs that explain why people use Garforth and New Pudsey and think

	they would explain it?
PH	Yes normal practice.
B	Their value is about 70 minutes?
PH	These do include some of the quality factors we were discussing earlier...Um..o...para 4.5, page 40. Says values between 50 and 90mins.
B	We've got a different value for Garforth than for New Pudsey so did ou take an average of the 2?
PH	Yes I did.
B	You reduce the cost by this no of minutes as a negative figure?
PH	Y
B	You say you adjusted it for the quality factors - can you explain that?
PH	The transport model has a representation of quality for the stations, Stourton and Bodington. I've taken them out so the calibrated factors are not affected.
B	So if facilties at Bodington would warrant a penalty of 2mins you would take 2 mins off the Garforth and Pudsey average?
PH	What I'm considering here is whether a car driver wishes to stop break their journey and use P&R. I want to use the direct evdence of how attractive P&R is for car drivers. Here we have an observation..a survey at existing sites.
MW	I was told there weren't any existing P&R sites; by Mr Haskins. That was misleading because I would have asked further questions.
NC	These are *rail* park and ride.
MW	Perhaps he was right. I was led to believe that these ere equivalent of these using a bus.
B	I'm not sure in what way we areadjusting. Let's say average of minus 70. Is that the ASC you apply, or do you add or take ff something?
PH	Using hypothetical numbers i the representation of quality at Garforth was 5mins ...I'm removing the differential. If
B	If Bodington has a quality penalty of 5mins. The ASC you want to apply is minus 70. What do you do?
PH	I think I added. The model entered into the model is lower. All I'm doing is ensuring that the difference in public transport journeys, which doesn't apply to P&R, isn't applied to P&R.
PH	The effect is to reduce the number, and to make it less attractive.
MW	In effect adding a penalty.
PH	Yes.
B	Having done that, is ASC included in the generalised cost or travel time, when you pass it to Mr Chadwick or is it separate?
PH	I'm not certain. [stares into space].
B	It's quite important.
PH	The info is used in a number of different ways. I think the answer is I don't.
MW	Clarify what you don't do?
PH	Mr Chadwick uses generalised costs in presenting overall benefits...The question is are they included in the travel time. As a direct measure of travel time, no. But I cannot know whether it is included in any...
NC	I've been passed a note and the answer is no.
B	You would tell him what the ASC was separately?
PH	A car journey to a car park would not include the ASC.
B	Starting out with Garforth and New Pudsey you average them and then bias the numbers downwards so as not to benefit from the public transport advantage. But let's esablish

	how comparable they are. Each has direct rail link with max 1 stop between them an Leeds City Centre station?
PH	Yes
B	Semi-segregated, 11 stops.
PH	Y
B	11 minutes vs 19mins journey time.
PH	Y
B	Would be more attractive?
PH	Yes. Bhut we have measured all those factors and the ASC is the residual.
B	No because the ASC is all about perceptions of things that you cannot measure. Isn't there still something in the driver's mind, intangibles.
MW	Other factors like number of trains and frequency and whether the distances are similar?
PH	The frequency will be higher. There are differences and always will be issues whether the perceptions will be identical. These are the only sources of data available to me and I have expressed concerns.
B	Wouldn't want to stick your neck out?
PH	I've expressed the tolerances.
B	Something that would stick in my mind is the number of stops and you don't measure that.
PH	I don't disagree; it may be a factor and is part of my concern.
B	These ASCs are large by model standards- 70mins is a large percentage of the generalised cost.
PH	They are but models do have wide parameters. I wouldn't call these exceptional or implausible.
B	Page 43 of C-1-3 - shows the distribution of ASCs for on-street parking and off-street parking. Ranging from minus 20 to plus 35 and for off-street minus 45 to plus 40. It's double these values, 70?
PH	There's a distinction to be make. These relate to parking in the city centre and the cost will be large for P&R.
B	The average ASC is around 0 for on-street and minus 10 for off-street?
PH	Zero is the central value we happen to use.
B	The mean for off-street is about minus10 by eye? Can we agree "minus a bit"?
PH	Yes.
B	In the model you represent the difference between city centre and P&R parking. The differential is, let's say, minus 60?
PH	Yes.
B	So the model gives the built-in advantage for the P&R of about 60 minutes , over and above the generalised cost we can understand.
PH	Those are the numbers.
B	Just so we've understood what the implications are. The implication is, if everything you could measure said the advantage is for parking n the city centre (parking charge, journey time, everything) and say you get a generalised cost of 50. And then you do it for P&R and it has a generalised cost of say 100, the model will say a person is most likely to choose the P&R?
PH	As you've phrased it, yes.
MW	Is that realistic to say the generalised costs would be 50 and 100? How does this ASC relate to generalised costs- is it a small percentage of the generalised costs or is it a similar scale to the generalised costs scale? It's relative isn't it? If a relatively large proportion of the generalised costs it will make a bigger diference.

PH	I don't know the absolute costs to compare.
B	You do have some. I remember reading somewhere that the difference in cost...
PH	Table 16 on page 41.
B	So for train from Garforth to the city centre
PH	There will be a car journey too.
B	The PT cost is 82, and the highway cost is 28. So ASC is more than twice the highway cost and of the same scale as the PT cost.
PH	Of the same scale as the difference between them and the differential is important.
B	Well its more than that.
MW	I;ve understood it now, thank you.
B	The ASC is in magnitude about the same as the total generalised cost from Garforth to the City Centre in absolute numbers?
PH	Yes
B	Its non-existence would have a very significant impact?
PH	Y
B	A crucial element of the model and it wouldn't work without it?
PH	Yes.
B	Yet it reflects all the things we don't understand - the uncertainties- in your words .
PH	Yes.
B	If we go back to APP-103 at p.86 (spider diagrams). This is showing the NGT case turning flows in the morning into the P&R side. This one shows more traffic coming into the P&R site from the south than the north. A flow of 200 from north and 150 from south. The 150 from the south- do you think that's the sort of spread you'd expect?
PH	Yes - adjacent to ring road.
B	Do any people get sucked in from the south of the ring oad.
PH	No -maybe a few - a spread about 3 miles from the car park/
B	Not substantially from within the ring road?
PH	No.
B	Another unusual element is the differential factoring ? You did it because the catchmen t area was too large?
	It is weighting the generalised cost for the car element of the journey more highly and making it less likely people will drive a long way; and underweighting the public transport. Its consequences depart from one of the axioms of modelling because no behavioural theory that underlines it?
PH	Well let's look at E-3-11 guidance docs. Page 30.
B	Saying people are more sensitive to car costs as to public transport costs. Not similar to what is done here?
PH	Very similar-about double sensitivity.
	The 0.065 implies twice the sensitivity to an identicalchange in public transport time for cars. The coefficients there in the equation in C-1-3
MW	1.71 and 0.82?
B	I'd suggest the behaviour evidence is that people over-weight things associated with public transport - tend to under-estimate time taken to drive somewhere and over-estimate time taken by PT.
PH	People tend to weight journeys they make rather than those they don't.
B	On top of that.
MW	Is that your theory or have you got evidence on that?

B	There is a lot of evidence on it and I wonder whether it is necessary. People generally say time spent in a car is more comfortable, put the radio on, comfortable seat and underestimate the delays.
PH	I'm not disagreeing on that but that's not what were representing,
B	Are the costs you passed on to Mr Chadwck the weighted or unweighted costs?
PH	The highway element and public transport elements are handed to him, unweighted.
B	He receives 2 trips (private mode element) then PT element.
PH	Yes
B	Not multiplied by 0.7 or...?
PH	No they're not.
B	Your level of comfort, you said plus or minus 50% on tolerance and confidence in the result.
PH	Yes.
B	I'll now change the topic. Can we go to para 3.13 of your Proof? You draw attention to fact that DfT drew attention to trade-off between simple and accurate model. You describe how you progressively refined the tools. I presume you wouldn't claim to have refined a model that would be required if the scheme got to the stage of final submission for funding?
PH	I'm not certain that that's the case. It may be, it would depend on timing an a number of factors.
B	Can you go through some of those?
PH	Next stage would be approaching the Department for conditional approval of funding. They would wish to review the forecasts. If there was a delay of some yeas, for example, I would wish to review thedata.
B	What about the functionality. If on P&R not happy beyond plus and minus 50%?
PH	Probably sufficient for this stage and also that stage. Would depend on the scheme and on the requirements.
B	For this scheme would you anticipate doing further calibration and more intensive validation?
PH	I would anticipate further audit and challenge. Whether further refinement would be needed, I'm not sure it would.
B	I took this from your para 3.14. You describe a process of refinement. Are you saying for this scheme, you've got there?
PH	I you recommended approval, the age of the data wouldn't be a problem. I'm certain probing qustions would be asked but I'm not certain any improvement of the model would be needed.
B	So even though the patronage from P&R is an important part of the business case, no refinement needed?
PH	It's small, not the majority, less than half.
B	If we've currently got a model saying "I wouldn't want you putting weight on that only plus or minus 50%".
PH	That would be a question how important it was for te business case. I can't answer that. What I'd probably do is run a sensitivity test.
B	Can you describe some tests for some of the following. Curently yu have a simplified representation of the network. What tests have you done to test the significance of that simplification?
PH	What I've looked at is the change inthe odel outputs since the 2012 business case resubmission and the refinements and developments set out in C-1-3.
B	The net changes are significant- runtime, mode choice highway. Did you try to isolate the

	effect of the improvements to the highay model?
PH	To an extent. But no specific test for impovements of the highway network.
B	I sed to code a small area to show what the effect was of adding detail. Have you done anything like that?
PH	No.
B	Have you done any tests to see how sensitive the model is to small zone size?
PH	No I haven't done a version of the model with smaller zones.
B	What about the effects of having a dynamic link between congestion experienced by road traffic and NGT?
PH	I have looked at journey times. It is related.
B	If you have no link and assume the buses and NGT are isolated fro it yu don't know what happens to demand?
PH	I haven' reported a test on bus journey times. No but I do have info to how the model responds to changes in bus quality and I can interpret how sensitive the model is to changes in bus journey time. I have done tests to satisfy myself.
MW	Is this a doc that's available?
PH	No
MW	I don't think we can count it.
B	That's only a test of changing runtimes, not a link between them?
PH	Indicates the impact.
B	What about a test of lack of representation of NGT and bus capacity?
PH	I did a test that represents effects of crowding on NGT.
B	We don't have a test of there not being sufficient capacity to get onto the first GT vehicle that arrives?
PH	We have a test that indicates what would happen if everyone stands.
B	Yes but more and more people standing gets worse and not getting on is worse.
<MW	Just answer -is there a test whether people can get onto the bus?
PH	No. It is possible to interpret the tests that have been done to get an indication.
MW	Can we move on and answer the questions.
B	Para 8.21 of your Proof you say have demonstrated impacts are not significantly affected by general forecasting uncertainties. But can e go to E-3-22 para 3.4.5. DfT want you to consider policy context uncertainties - existing operators may respond by reducing services or increasing competition. The Dept expects that the impacts will be explored. Have you done a test reflecting "serious competition"?
PH	I have illustrated the effects of a bus operator response - by continuing /maintaining frequency despite a reduction in demand.
B	Nothing on serious competition, just to be sure?
PH	With a reduction of one-third in demand, that requires quite an investment by the operator.
MW	That's what he's interpreted as serious competition.
B	Para 3.4.8. Describes "soft measures", marketing etc. The Dept expects the effects of widespread application of soft measures will be demonstrated by a sensitivity test. Have you done such a test?
PH	I have done a test on quality.
B	That's not what this is talking about?
PH	No.
B	3.4.10 -Parking changes. Relevant because of undermining of P&R. It says where parking

	controls form an important element the Dept will expect sensitivity test?
PH	No I haven't done such a test. The first bit says "rare".
B	I was talking about parking controls, not charges.
PH	No, not parking controls.
B	Your proof 8.17. But could have a break now.
MW	How long you'll take?
B	As much again.
MW	[3:15] adjourn till half past 3.
B[15:31]	Your proof at 8.17 you report on C-1-9 and sensitivity tests. Can you direct us to a test on the following assumptions: That P&R sites will not be perceived as attractive as rail park and rides/testing different ASC values?
PH	No. No formal test.
B	The public transport runtimes will remain constant even if congestion gets worse over the A660. You said had tested a change in the runtime but not them going up together?
PH	Correct.
B	The "step change" referred to at your proof para 6.6: a sensitivity test?
PH	There's the NBA test in Appendix-5-3 or C-1-9 .
B	I was looking for the result
NC	C-1-9 is a summary ...
PH	Table 9 in C-1-9 at p.14 sets out average travel distance. There are 56m km and 14m trips so about 4km.
B	We're looking for the "full-quality NBA"
Ph	I think page 21 to the appendices to my Proof.
B	No - can't be it. Says buses higher quality but less than NGT.
PH	This is it - reducing the quality of NGT by 2 minutes.
B	As I understand it, this test is halving the advantage of NGT but I'm interested in a test where NBA is the same quality .
PH	The other half is the central case forecast.
B	I'm interested in the BcR and all the measures one has. I'm looking for a test where the NGT is perceived a s the same as the bus. But the results are just "boardings", the demand. Have we *got* a test that tells us anything more than how many people would get on, if bus was perceived as the same.
MW	The NBA represents NGT only half the quality .
B	I don't know whether there *are* any results where NGT is perceived as the same as a bus. Is there one?
PH	I think you're asking me if I've tested alternatives?
	I've tested 2 alternatives- one is NBA being a bus and one is NBA being halfway.
MW	You haven't tested a bus that was seen as the same as NGT?
PH	That would be the same as the NGT.
B	But the congestion and other matters are not presented?
PH	I've presented some things other than boardings.
B	I'll ask Mr Chadwick. At page 14 of C-1-9 we have, we can take the "Next Best" and say 27% less demand.
PH	Yes.
B	Telling us that if the NGT vehicle was perceeved as the same as an indiv bus then the

	demand would go down by 27%. That's only vehicle quality. This is 5.5m. The stop quality is 5.8minutes. Is there a test looking at the bus stops sensitivity?
PH	No there's not.
B	We might expect that if we had simply looked at the bus stop penalties the reduction in demand would have been of teh same order or a little bit more?
PH	Yes a fair assumption.
B	If thee *were* a test that said the bus vehicles and the bus stps were the same as the NGT stops and vehicles, it would be about 40% less patronage?
PH	If you proposed a service with no advantage over buses, it would be lower. I haven't tested it.
B	The sensitiity of teh quality factors hasn't been headlined. Is that anythin to do with you n the business case?
PH	Chadwick [shakes head].
B	Page 28 of main proof. Not significantly affected by uncertainties. Wouldn't you agree that some key uncertainties haven't been looked at at all?
PH	I've looked at high and low growth scenarios. If there were factors specifically related to the scheme that is not what I'm discussing in this paragraph, say if other operators respond in particular ways. In many cases it is possible to make inferences and deductions from the tests I have done.
B	How do you make inferences about sustained competition?
PH	You did it yourself - could make inferences about the quality of the changes. If I change it by X or 2X you get a result.
B	You mean take the results we have and reinterpret them.
PH	Yes
B	It would be helpful to do that. It could have been done. But it hasn't been done.
PH	The information is available.
B	You were asked by Mr Cameron to respond to my assertion that combined uncertainties was not done. You said it would require additional effort that could not be justified?
PH	An element of proportionality.
B	WebTAG E-3-24 is the main guidance on treatment of uncertainty in model forecasting. And it refers to scenario tests to test combos f factors. It's what DfT think is absolutely the think that should be done and comes higher up the list than sensitivity testing.
PH	In some circumstances it maybe helpful. It's always useful to do more and have more information but there is sufficient.
B	Not got tests with more than 1 thing going wrong at one time.
PH	No but can look at them together.
B	Well you can't just add them together.
MW	It's fair that you don't agree?
PH	Yes.
B	Can we return to the question whether in view of relative lack of detail it is fit for purpose of exploring the relative merits of NGT and alternative much less costly solutions?
PH	It is appropriate to look at the corridor. We discussed small cycling interventions or local isolated interventions where it would not be suitable.
B	What interventions would it be suitable for?
PH	Well, substantial improvements in bus services for instance.
B	The low cost alternatives will have smaller impacts but much cheaper - you'd need o know what they are doing in relative detail?
PH	I would agree with that principle.

B	You still agree it is fit for purpose?
PH	For the range we've looked at - *a* LCA, NBA and NGT. I we were asked to look at other alternatives the questions you've put to me are appropriate and I would consider them.
B	You claimed DfT have been happy with what you've done so far.
PH	They've had intense discussions and their letters show they are content and yes they have authorised it to proceed.
B	You say that because they have let it proceed they must be happy?
PH	Well yes
B	C-6-8 s the letter with the condition that you must use the *new* model and provide a comprehensive set of sensitivity tests
PH	And there was subsequently an extensive dialogue documented in the C2 series of docs.
B	Given that it's not the same model -some enhancements and degradations (crowding on trains only; removal of link with congestion) - not what they had in mind?
PH	I don't agree with you. There have been refinements since. Those refinements have been discussed with DfT but because it's not a stage when DfT would pay money there's been no formal audit.
B	I'm just looking at this letter which you quoted as DfT being happy with this model?
PH	No I think that's the wrong reference. This is the letter that *started* my involvement in the project.
B	Well it's not saying they are happy with anything in particular but saying they are unhappy and you must do X Y and Z.
PH	Well , relates to a period before I was involved
NC	Is Prof Bonsall restricting himself to comments just to the model?
B	Yes. I read it not as saying we're happy with the model but that you should use a different model.
PH	And I would add to that that it must have been considered at the time but agree it was requesting further modelling work.
B	I want to go to 3.28 in the proof....I've got the wrong reference. Next item was , when Mr Cameron took you o the 2012 conditional approval letter. C-6-15. The AECOM documents were one side of the dialogue. Do we have the other side of the dialogue?
PH	There were discussions but may not be minutes. They are evidence info was presented to DfT.
B	Mr Cameron took you through the 2012 letter and suggested the absence of any complaint was to be interpreted that they must have been happy?
PH	It's the conclusion of detailed scrutiny of the case and they gave approval.
B	To present that as Dept being happy is a stretch?
PH	No. The Dept if not happy will say so and request changes.
B	We know they subsequently requested changes to SATURN modelling?
PH	They were happy it was capable for the purposes for which it was intended.
B	Why did you do more work on it - I thought we agreed earlier that they were not happy with performance of the SATURN model.
PH	They were happy that the work done was sufficient for the purpose.
B	Could we turn to E-3-25, s.3.4.1 (p.28), discussion of fitness for purpose. Para 3.4.2 - meeting the criteria does not guarantee that it is appropriate. I think you agreed that it was about sensitivity and appropriateness?
PH	No. The final test is sensitivity. I have set out in my proof what we looked at.
B	Page 8 of your Proof. You say may be less achievable to meet the benchmark criteria in lare scale models. Are you saying it;sa let-out because it's a strategic model?

PH	No- should have the same accuracy.
MW	Weren't you referring to the whole LTM rather than the part used for NGT?
PH	Yes.
B	E-3-25 para 8.3.17 is the original quote.
PH	Yes as I said, the area of detailed modelling is the NGT corridor.
B	Your proof doesn't include the second half of the sentence whivh change the meaning ("in these cases within the area of detailed modelling it should e achievable").
PH	It does and I say I'm looking at the criteria, within the corridor.
B	We agree that within the corridor there are higher standards and it ought to meet all the criteria for the NGT mode?
PH	Yes. These are not targets to exceed but measures f performance.
B	In your 3.4 you say you assessed it against 4 criteria. Satisfied yourself that the outputs are being used appropriately. How can you have been satisfied if you didn't know what they were used for?
PH	Where I was aware of their use.
B	Has there been any independent third-party scrutiny?
PH	No. The DfT scrutiny and review was of the 2012 model. While we have discussed the model with them and my impression though not documented evidence, is that the reception was positive, that's the status.
B	Is it sufficient to show the impacts within the corridor?
PH	The detailed routing on adjacent roads, it is not sufficient. Not in my view a requirement of this model.
B	E-3-25- makes a distinction between the corridor and the rest of the modelled area: para 2.2.5 "small zones", "very detailed networks" junction modelling and flow . I'm looking at what happens within the area of detailed modelling. You say corridor is the route of the NGT.
PH	Yes
B	I think we established that DfT suggested 1 zone per bus top or cluster.
MW	I think you accepted some of your zones were not meeting the criteria.
PH	Yes but materiality was the question.
B	"Very detailed networks"
PH	Include rat runs -some, not all of them.
B	We've been through and there were omissions (curious flows Moor Road and Weetwood Lane), your claim was not claiming to represent that level of detail. Not the level of detail the DfT are looking at when talking about detailed modelling.
PH	We have to look at the context of the scale of the scheme. Whether it adds value is the question. And there is overriding guidance of proportionality.
B	Your definition of a detailed network is a rather more strategic one?
PH	Yes a fair summary of our discussion.
B	Adequately represents the reality. How good a representation of reality is your representation of Moor Road?
PH	Poor.
B	Would you go as far as "very poor"?
PH	No.
B	Shouldn't your claim be "as far as I have looked, I am satisfied".
PH	That will always be the case. For the purpose I have used the model I remain satisfied.
B	Remind us, in your opinion, what purpose is LTM fit for. We've said not fit for detailed

	flows within the area.
PH	Used for journey times along the corridor, business case, overall flows within the corridor. Fit for that. It has been used to indicate overall changes in traffic on A660 and the total quantum of traffic on adjacent roads but not individual roads.
B	Are you saying combine traffic across at Headingley,
NC	I would ask you not to interrupt. Mr Hanson tends to speak slowly because he thinks before he answers.
Mw	Any other purposes?
PH	Next use is Mr Robertson's assessment of design of the junctions from the corridor There I stated that I wouldn't use the outputs directly and we explored the reasons for that. The interpretation as used is appropriate and has been considered in an appropriate way.
MW	The purposes for which LTM is fit for- we're straying away.
B	Junctions weren't your model but Mr Robertson's. You're happy for it to be an input to Mr Robertson even though we agreed we couldn't rely on them.
MW	That's Mr Hanson's answer even if you disagree.
B	Shouldn't you take all reasonable steps to establish as early as possible whether the project was likely to succeed at he end of the day?
PH	Can be expensive. One of the things I had to struggle with was to introduce something simpler like parking charges often good to have simpler models at the beginning.
B	I'd suggest you should usefully have tested some basic scenarios early- very cheap, rather than saying it was difficult to test combos of tests in the model later.
PH	It's a balance. Can be a good investment to model more earlier on.
B	DfT don't have great resources and don't complete the assessment of tools to the level they finally will?
PH	Very much so - tailor the work to the stage.
B	Don't you agree that this inquiry is sufficiently important for the level of rigour and robustness to be the same as is required by DfT at final stage?
PH	As you've phrased it, I agree. At the stage the project is at. I wouldn't expect the assessment to be different to what DfT would look at.
PH	[grins]. [composes himself] Well I commented that all things being equal I'd have thought the same or similar info would have been used for conditional approval.
B	Are you sayig what you provide for the inquiry should be what you provide for conditional approval level rather than the final approval?
PH	At this stage the inquiry has been before conditional approval., so I think the answer is no. It really is a decision for you.
MW	This isn't my decision. It's for the SoS to decide whether this is sufficient evidence. It's your opinion as to whether the evidence is sufficient?
PH	I think the evidence is sufficient to consider.
B	You're saying, it isn't important enough to require the level of rigour of the final stage?
NC	He's already said he doesn't know and is not sure.
B	Finally, APP103. Total door-to-door journey time, summed across all modes. 6th page. Question 9. Indicate how you produced that?
PH	I think we had a further exchange on this but the number here is an accumulation of the person travel time represented in the model.
B	How did you produce it?
PH	From highway model, we took door-to-door times.
B	I want a technical answer.
PH	Well it's an accumulation

B	I'm expecting you to use words like cost-skimming?
PH	A skim of he travel time, unweighted, all aspects.
B	A costs skim?
PH	Yes.
B	Could you have used a similar method if I'd asked you for say the car costs.
PH	I'm sure the answer is yes.
B	Question 5 was about total of quality factor benefits and the answer to that was several pages to say it was all too difficult.
PH	I think that was a response that Mr Chadwick provided, if my recollection was correct.
B	So if I wanted to pursue that I'd need to ask Mr Chadwick.
PH	That would be more direct.
B	If I had asked you, leaving him out of the equation, could you have done a costs skim?
PH	Yes but how accurate it would be would take time to consider.
B	Well I took out my calculator to get a ballpark figure. Could have done it?
PH	It's always possible but it's a question of what is proportionate.
MW	Thank you Mr Bonsall. I'll be surprised if others can match that.
NC	Mr Longley says he will ask questions but w are struggling to find anything in his evidence that goes to Mr Hanson's evidence.
MW	He may be misunderstanding it. Mr Sleeman, have you?
[Sleeman]	I;ve only a few that haven't been asked.
NC	We've a document to hand in, APP-129, as a response to FWY119 and FWY124. A reference to a technical note 50029C which is FWY124.
GJ	Can I ask, it doesn't identify the author. Are there going to be witnesses whom I can ask questions of about it?
NC	Mr Hanson saw an earlier draft but we haven't communicated with him. Mr Chadwick and other members of his team looked at it. Is Mr Hanson able to answer questions on this?
PH	Correct. Yes. Did see an earlier version.
GJ	As we know my difficulty is Mr Cheek isn't here but if we have to raise something that hasn't been put..
NC	I wouldn't be taking that point. And in the same way we're waiting for something from M Cheek.
MW	There were docs requested from Katie Peerless.
NC	I wasn't in the room/
GJ	There are a number of outstanding things - e.g. Mr Smith I asked for is brief and scope.
NC	We have a running list, Sir.
MW	[17:07] Inquiry's adjourned. 9.30 start 3 'clock finish. Mr Jones next.