



**MULTI-MODAL STUDY  
A453 NOTTINGHAM TO M1 JUNCTION 24**

**OPTION CONSULTATION BRIEFING**

**FEBRUARY 2002**

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**MULTI-MODAL STUDY  
A453 NOTTINGHAM TO M1 JUNCTION 24**

**CONSULTATION  
ON  
OPTIONS**

**FEBRUARY 2002**

**BRIEFING NOTES**

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## **INTRODUCTION**

This Briefing Note has been prepared to provide a background to wide ranging consultation with stakeholders to develop a preferred transport plan for the A453 corridor. Earlier consultation has helped to identify a preferred strategy containing a range of policies to address the many transport issues in the corridor. This wider final consultation is to involve all stakeholders in the examination of the balance, or 'trade off' between various elements of the strategy, for example the balance between the level of encouragement to change peoples mode of travel by policies such as changes to public transport fares and parking charges, and, the scale of highway improvements. This will lead to the identification of a preferred option.

As a reminder, all the studies in the Greater Nottingham areas are directed by a common Steering Group, with each study managed a Project Management Group. Both of these groups consist of representatives from a wide cross section of the regional community who, together with input from the Wider Reference Group of almost 100 local organisations, provide a new and inclusive process for real input into the management of multi-modal studies.

## **KEY FACTORS**

This section provides a brief reminder of Key Transport issues and facts which emerged from consultations at the outset of the study and analysis of the extensive portfolio of travel surveys undertaken in the early summer of 2000. Both of these have been reported separately.

### **Key Issues**

The following list is a selection of some key issues arising from consultation:

- ✦ Traffic implications of growth and development around East Midlands Airport
- ✦ Traffic congestion at Junction 24 and at junctions along the A453.
- ✦ Priority should be given to reducing accidents along the A453.
- ✦ Diversion of traffic through villages at times of congestion/incident.
- ✦ Environmental impact of traffic especially through Clifton
- ✦ Poor service and high cost of public transport
- ✦ Widespread support for a major road scheme to improve the A453
- ✦ Strongly held views, both for and against particular routes for a Clifton Bypass.
- ✦ Desire for an integrated multi-modal solution.
- ✦ Strong support for improved public transport, especially NET through Clifton
- ✦ Environmental factors in evaluation of Options
- ✦ Walk and Cycle movements should be facilitated
- ✦ Improve accessibility to Nottingham to aid economic development.

This is only a selection of the many issues identified to us.

## **Key Survey Findings**

The following are a reminder of the results from the surveys presented previously:

- ✦ Residents in the A453 corridor make 66% of journeys by car, 11% by public transport, 18% on foot, 4% by cycle and 1% other modes.
- ✦ The journey purpose of residents in the A453 corridor is, 32% shopping, 24% work, 16% leisure, 8% business, 7% education and 13% other.
- ✦ 47% of journeys made by the A453 corridor residents are between 300 yards and 3 miles in length.
- ✦ Traffic on the A453 at Thrumpton includes 27% commercial vehicles of which over half are goods vehicles larger than a 'Transit' van.
- ✦ Traffic on the A453 at Thrumpton includes 27% destined beyond Nottingham with over half of these having destinations even further east.
- ✦ 45% of traffic on the A453 travelling towards Nottingham has origins beyond Derbyshire/North Leicestershire.
- ✦ Over 90% of journeys to the East Midlands Airport made by both travellers and employees are by car.

The Survey Report containing many other findings is available on the Study Website [www.a453multimodal.com](http://www.a453multimodal.com)

## **IDENTIFICATION OF A PREFERRED STRATEGY**

Following consultation last year the study team identified four alternative transport strategies for development and testing using the transport model.

- Strategy I Best use of existing transport networks
- Strategy II Maximum Public Transport and demand management
- Strategy III Moderate public transport and demand management
- Strategy IV Major Highway Scheme

These four strategies were not real alternatives, but represented the widest practical range of policies for influencing movement in the study area.

Following extensive testing using the transportation model and with the valuable assistance of the Project Management Group and consultation at the strategy development stage a preferred strategy has been established. This may be summarised into a five main parts:-

- ✦ **Public Transport (major investment)**
  - NET, heavy rail and bus schemes
- ✦ **Demand Management and Model Choice Policies**
  - e.g. workplace parking levy and public transport fares
- ✦ **Highway Improvements**
  - cater for residual demand, accessibility, safety and environment
- ✦ **Complimentary package**
  - freight, pedestrian and cycle networks, local travel behaviour
- ✦ **Strategic and National Measures**
  - national initiatives to change travel behaviour and M1 MMS proposals

There are many ways in which schemes and policies can be combined to implement this strategy. Our initial option testing has sought to establish the balance between the first three elements, making provisional assumptions for the others.

## **OPTION IDENTIFICATION**

Consultation with elected members, transport providers and the Wider Reference Group has provided a valuable local input to the process, and the study team is extremely grateful for the time and effort given by representatives of these bodies. The findings of these consultations have been reported separately, but key findings from the Wider Reference Group seminar on Option Identification held in September 2001 may be found in the summary of the seminar report in Appendix A.

The chart overleaf outlines the process which has been used to arrive at Options (packages of schemes) to address the many transport issues in the corridor, and the ongoing process to enable us to select a Preferred Option.

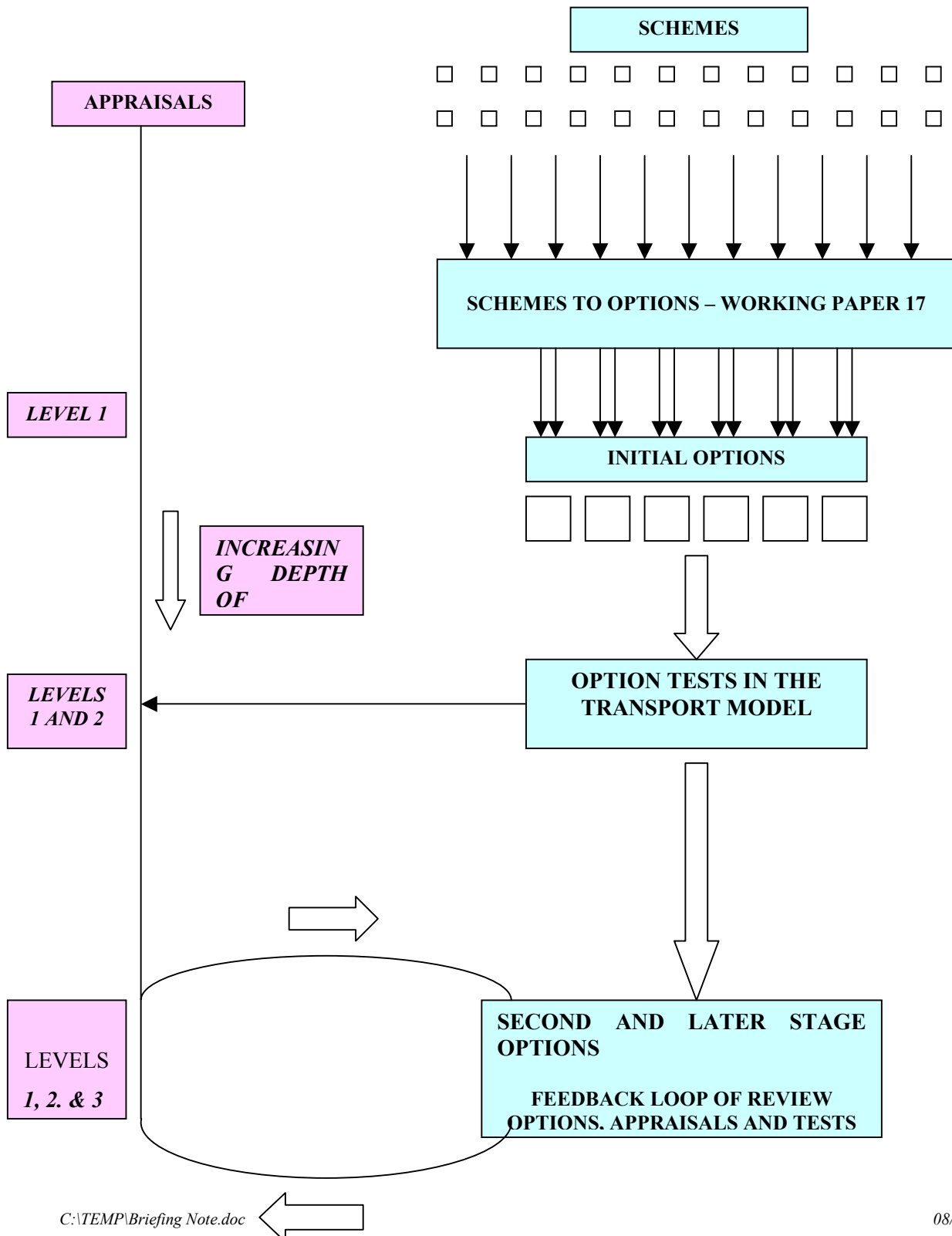
An initial list of over 150 Schemes has been reduced to less than 100 by increasing depth of appraisal through levels 1, 2 and 3. Schemes have been identified on plans and engineered to a point where sensible decisions can be taken as to whether to take a scheme forward for more detailed appraisal. Key factors in the sifting process have included contribution to resolving transport problems and environmental impact.

Many of the schemes considered are reflections of policies in Local Transport Plans prepared by local authorities influencing the study area. Other schemes feature in the plans of other transport providers such as the Strategic Rail Authority, the Highways Agency and public transport operators, and still more originate from consultation and the study team itself.

Schemes already planned within these programmes and having fulfilled appropriate statutory procedures and with funding secured have been regarded as committed. These are included in the Do Minimum scenario against which all Options must be assessed. The full schedule of committed schemes is given in Table 1 and includes the following: -

- ↻ East Midlands Parkway Station and East Midlands Airport shuttle bus service
- ↻ NET Line 1 with bus/rail interchanges and footbridge to Nottingham Station
- ↻ Midland Mainline rolling stock renewals
- ↻ More bus lanes in Nottingham
- ↻ Dualling of the A46 between A606 and Newark
- ↻ Improvements to the A60 and A606 junctions on the A52 Nottingham Ring Road

**DIAGRAM 1 Option Development and Parallel Appraisal**



## **PUBLIC CONSULTATION ON OPTIONS**

The Study is now focussing on three short listed options from which a preferred option will be developed. Work continues on wide ranging technical appraisals including the criteria of environment, safety, accessibility, economy and integration. Work undertaken to date has shown that we need to examine the balance, or 'trade offs', between various elements of the strategy, particularly the balance between demand management to encourage people to change travel behaviour by mode shift towards public transport, and the scale of highway improvements,

The three options, A, B and C, have been defined to include a common comprehensive public transport package with different levels of policy to promote mode shift (demand management) and different scales of highway improvement:

**Option A** : Substantial public transport improvements, moderate highway construction and full demand management.

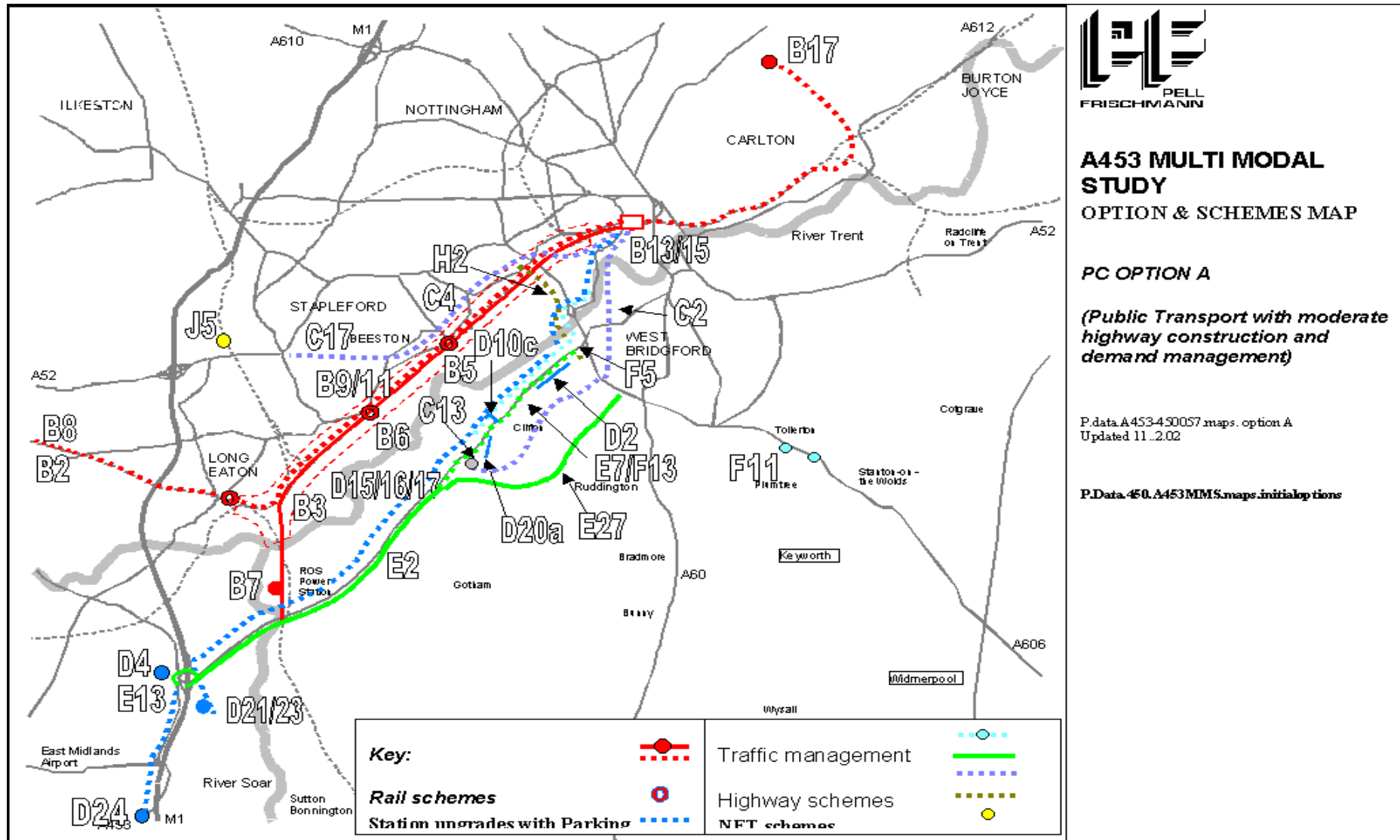
**Option B** : Substantial public transport improvements with major highway improvements and no demand management.

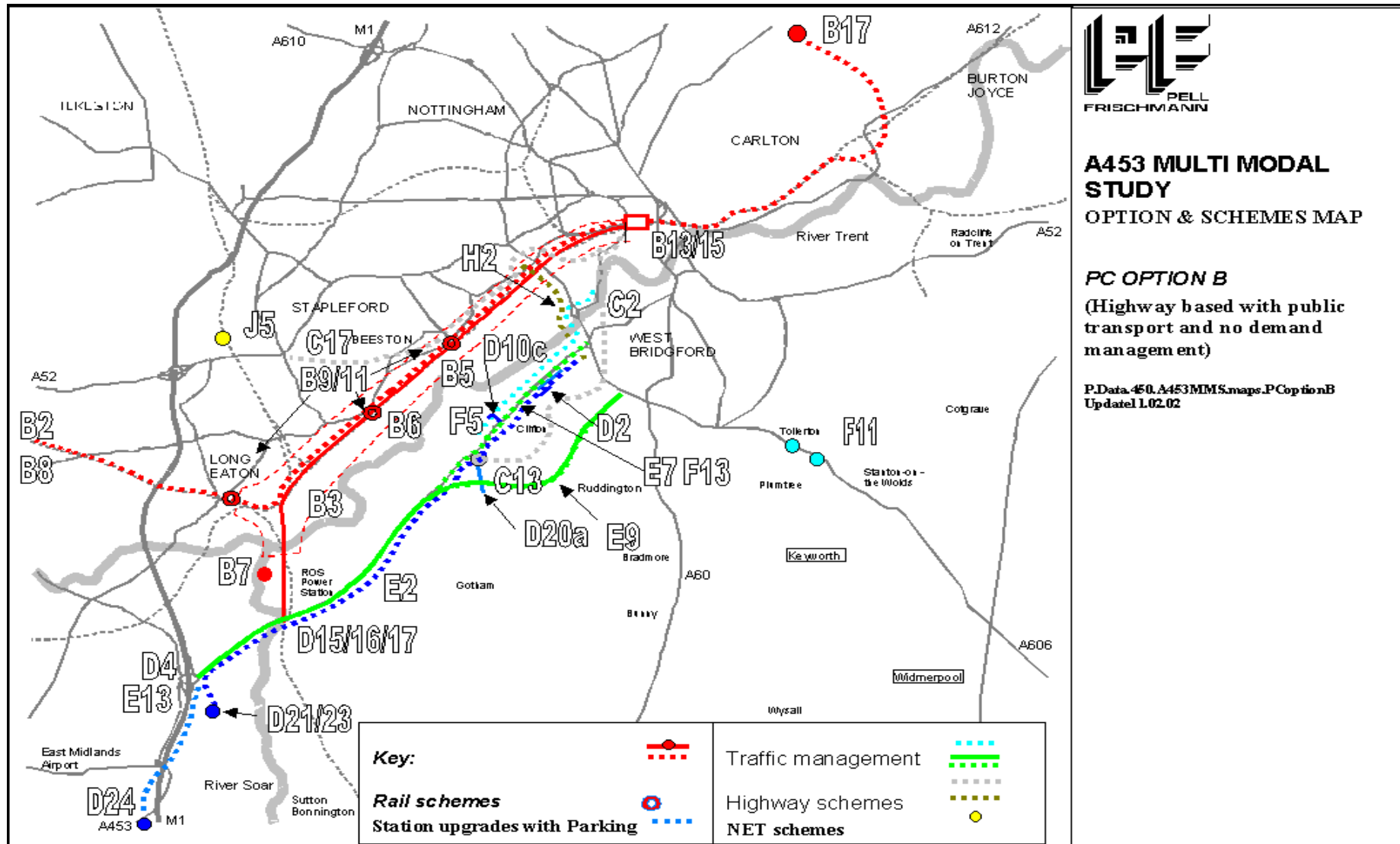
**Option C** : Substantial public transport improvements, minimum highway construction and full demand management.

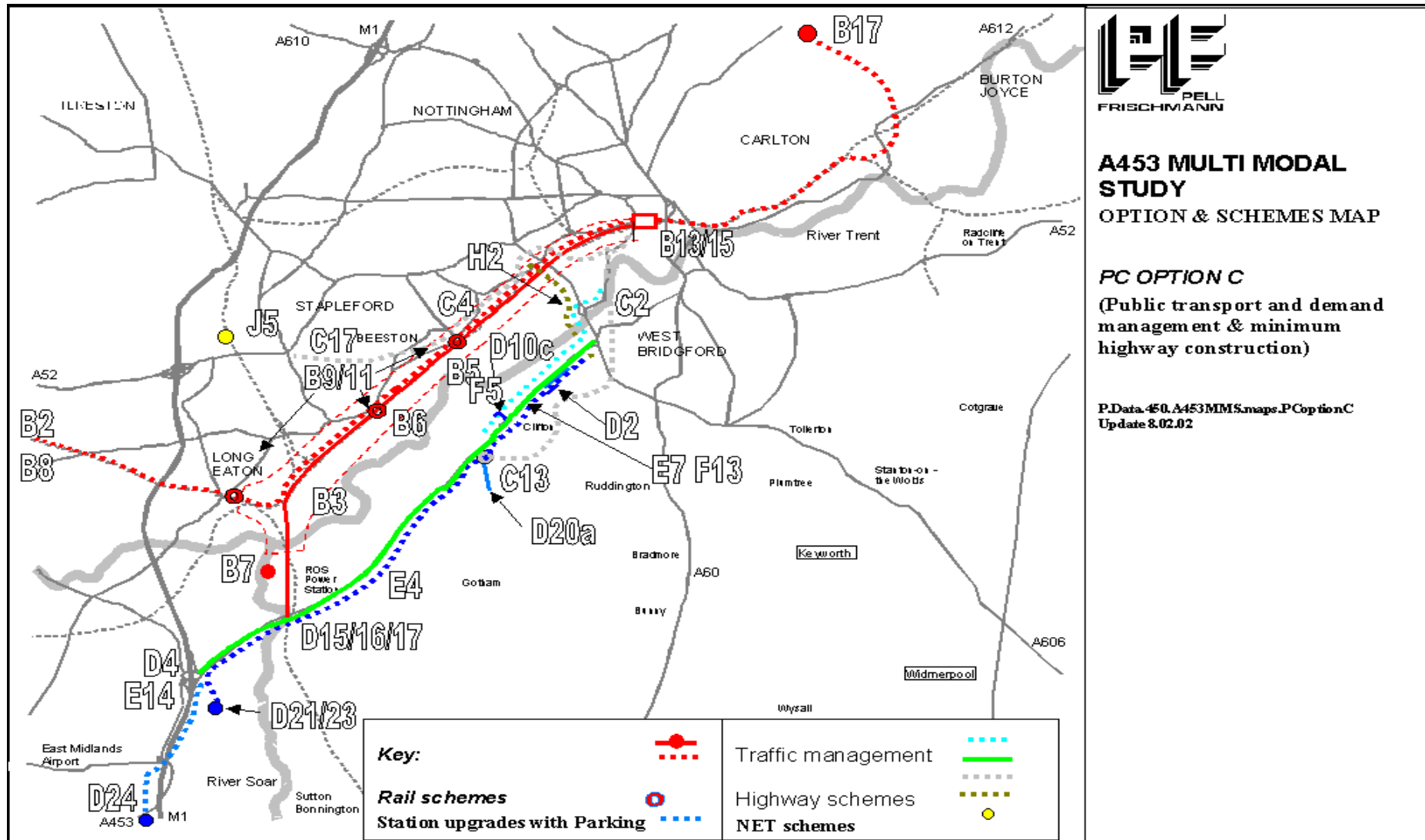
The diagrams overleaf illustrate in cartoon form the schemes which have been brought together to form the shortlisted integrated transport options for the A453 corridor. The schemes included in each option are scheduled in Table 1.

The main features of the package of demand management measures drawn together to encourage mode shift and manage traffic demand are: -

- Reduced long stay parking in Central Nottingham (-25%)  
and increased charges for the remainder (+25%)
- Workplace parking levy throughout Nottingham City at £2 per day,  
assumed to be paid by the traveller.
- Reduced fares for public transport (-15%)







<b>A453 MULTI MODAL STUDY</b>					
<b>TABLE OF SCHEMES IN THE DO MINIMUM SITUATION AND IN THE OPTIONS (sheet 1 of 2)</b>					
(Do minimum situation is schemes that are already firm proposals independent of this Study)					
Ref. no	SCHEME	OPTION			
		DO-MIN.	OPTION A	OPTION B	OPTION C
B1	East Midlands Parkway Station				
B2a	Replacement Rolling Stock Midland Mainline				
B2b	Replacement Rolling Stock Central Trains				
B3	Trent PSB (Parkway-Nottingham) signalling and track improvements				
B3	Trent PSB (Attenborough South) Flyovers				
B5	Car parking at local stations				
B6	Nottingham – Parkway train service				
B7	Local Park & Ride facility at EM Parkway Station				
B8	Nottingham-Derby improved train service				
B9/11	Station upgrades to modern standards inc. Real Time information				
B10	NET line One to Nottingham Station footbridge				
B14	Multi Mode smartcard ticketing				
B13,15	Nottingham Station Masterplan redevelopment with extra platform				
B17	Gedling Station & Park & Ride service				
C1	NET Line One				
C2	NET extension to Clifton				
C3	NET/bus/rail interchanges	Line One			
C4	NET extension to Beeston				
C13	Clifton South Park and Ride				
C17	NET extension Beeston to A52 Bramcote roundabout				
D1	City bound bus lane Farnborough Road				
D2	Bus lanes A453 Farnborough Road to Silverdale Flyover				
D3	EM Airport-EM Parkway Station shuttle bus service				
D4	M1 Junction 24 bus priority				
D5	Clifton local bus service improvements				
D8	Bus Real Time information				
D10c	Bus service to Clifton Village				
D12	Bus marketing				
D15,16,17	A453 express bus services EM airport and Kegworth - Nottingham				
D11,18	Bus/NET/Rail integration of services				
D19	Gamston Park and Ride				
D20a	City bound Bus lane Clifton Lane (Gotham road) to Crusader Rdbt.				
D21	Local parking at major bus stops				
D23	New generation bus stops				
D24	Park & Ride site at M1 junction 23a				

**TABLE 1**  
Schemes in the Do Minimum and the Options

<b>A453 MULTI MODAL STUDY</b>					
<b>TABLE OF SCHEMES IN THE DO MINIMUM SITUATION AND IN THE OPTIONS (sheet 2 of 2)</b>					
(Do minimum situation is schemes that are already firm proposals independent of this Study)					
Ref. No.	SCHEME	OPTION included			
		DO MINIMUM	OPTION A	OPTION B	OPTION C
E2	M1 – Clifton dual carriageway scheme				
E3/4	M1 – Clifton single 2 lane scheme with grade separated junctions and climbing lanes				
E7	Clifton A453 single carriageway improvements inc. Crusader Rdbt.				
E9	Clifton Bypass dual carriageway eastern bypass				
E14	M1 junction 24 traffic signals scheme				
E13	M1 junction major improvement with A453-A453 flyover				
E27	Single carriageway Eastern Clifton Bypass				
F5	Extension of Urban Traffic Control system to A453 Crusader roundabout				
F11	A606 minor widening at Plumtree & Tollerton traffic signals				
F13	30 mph speed limit on A453 through Clifton				
G	Cycling schemes: Separate network of tracks, signing, safety schemes, cycle parks, re- surfacing of tracks.				
H	Pedestrian schemes: Segregation, Security with CCTV, priority, traffic calming, more crossings, safer school routes				
J5	Rail heads and sidings for road/rail transfer.				
I2	Workplace parking levy				
I3	HGV bans on unsuitable roads				
I4	Further parking controls				
I5	Further parking charges				
I8	Extension of Nottingham City centre Clearzone				
I9	Planning controls to encourage public transport & walking/cycling				
K2	Travel Education				
K4	Green commuter plans				
K6	Information				
K8	Reduce public transport fares				

**TABLE 1 (Cont'd)**

These measures are applied to Options A and C only, not to Option B

The main features of the highway improvements in each option may be summarised as follows: -

<b>Option A</b>	J24 M1 to Clifton Clifton	Major improvement with A453 flyover Dual carriageway with grade separated junctions Single carriageway eastern bypass, (eastbound access only at A52 Ring Road). On line traffic Management in Clifton.
<b>Option B</b>	J24 M1 to Clifton Clifton	Major improvement with A453 flyover Dual carriageway with grade separated junctions Dual carriageway eastern bypass (all movement at A52 ring road). On line traffic Management in Clifton
<b>Option C</b>	J24 M1 to Clifton  Clifton	Enhancements with traffic signals Single carriageway with grade separated junctions and crawler lanes. On line UTC and traffic management in Clifton

## **KEY FINDINGS TO DATE**

The assessment of the Options is an ongoing process, but has reached the stage where some key findings are emerging. The study team are keen to include the views of all stakeholders at this important stage of the evolution of study recommendations.

A summary of results from runs of the transportation modal for the three options is given in Appendix B. This shows road traffic and public transport passengers flows for various key locations and groups of locations (reference screenlines within the corridor of interest). An important aspect of interpretation of results lies in the comparison of Options with the Do Minimum (DM) situation which would prevail if nothing more were done other than the committed schemes. Also valuable is comparison with the Basic Year 2000 (BY) as this provides a benchmark against conditions with which people are familiar.

Overall, comparison of movements in the BY and forecasts for the Do Minimum situation indicates

- ✦ Traffic growth in the corridor of 14% to 2011 and up to 22% by 2021.
- ✦ Traffic growth on rural section of the A453 of 14% by 2011 and 19% by 2021, and through Clifton (Trent University Campus) of 9% to 2011 and 10% by 2021.
- ✦ Growth of public transport movements in the corridor of 30 % to 2011 and 36% by 2021 in outer areas and 19% by 2011 and 22% by 2021 across the A52 ring road (affected by Parkway Station).
- ✦ Overall there is likely to be a small mode shift from public transport to car.

Key findings from the assessment of the Options completed to date are summarised in the Schedules overleaf, where comments are made on 12 important assessment criteria.

Assessment is ongoing, and further information may be available at forthcoming exhibitions and seminars along with technical support for the conclusions already drawn.

## **Option A**

- ✦ Level of investment circa £370m
- ✦ Achieves highest usage of public transport across all 3 screenlines, 27% to 52% above Do Minimum.
- ✦ Achieves lowest level of traffic flow across all 3 screenlines, 6% to 34% below Do Minimum and below Base Year at the intermediate and inner screenlines.
- ✦ Some concentration of corridor traffic onto the A453 with 68% increase on rural sections, 19% through Clifton area (considering existing road and by pass together) but a significant 40% reduction on Queens Drive, all compared with Do Minimum.
- ✦ Traffic on existing A453 through Clifton reduced to below base year levels and likely to remain within capacity of existing carriageway to 2021 and beyond.
- ✦ Greatest improvement in environmental conditions through Clifton with highest potential for traffic calming, pedestrian and cycle safety.
- ✦ Adverse environmental impact due to dualling of existing road in rural areas, but with potential for sympathetic design and alignment of single carriageway bypass.
- ✦ Traffic flows on A52 Clifton Bridge reduced well below Base Year and to Base Year/Do Minimum levels on Ring Road towards Wheatcroft Roundabout (A606).
- ✦ Greatest potential for financially viable public transport and reduction of area wide traffic congestion.
- ✦ Demand management measures require community acceptance.
- ✦ Improved accessibility and safety for residual traffic.
- ✦ Substantial contribution towards reducing dependence upon the car

**Option B:**

- ✦ Level of investment circa £400m.
- ✦ Lowest level of public transport usage, only marginally above Do Minimum at all 3 Screenlines.
- ✦ Draws additional traffic into the wider corridor resulting in 7% to 13% flow increases at screenlines and substantial increased over Base Year.
- ✦ Considerable concentration of corridor and attracted traffic onto the A453. Whilst this does relieve other routes, traffic increase on rural sections of the A453 would be over 130% and some 100% through the Clifton area, with a small increase on Queens Drive, all compared with Do Minimum.
- ✦ Traffic flows on the A453 through Clifton reduced to below Base Year levels with the potential to remain within the capacity of the existing road to 2021
- ✦ Significant environmental improvements through Clifton with potential for traffic calming, pedestrian and cycle safety.
- ✦ Large adverse environmental impact due to new road building with limited scope for sympathetic design of the bypass due to the dual carriageway scale of the road.
- ✦ Traffic flows increased above Base Year at the congested Clifton Bridge and above Do Minimum on A52 Ring Road towards Nottingham Knight (+15%) and Wheatcroft (+ 6%) roundabouts where it is unclear whether planned schemes can accommodate the additional traffic.
- ✦ Public transport network unlikely to be financially viable due to lower patronage, reduced proposals and/or high subsidy inevitable.
- ✦ No issue of community acceptance of demand management.
- ✦ Improved accessibility and safety in some places and the converse in others.
- ✦ Little contribution to reducing dependence upon the car.

### **Option C**

- ✦ Level of investment circa £300m
- ✦ Achieves substantial increase in public transport across all 3 screenlines, 15% to 35% above Do Minimum.
- ✦ Reduces traffic flow across intermediate and inner screenlines to 17% - 18% below Do Minimum and to below Base Year. At the outer screenline flows are maintained at Do Minimum levels.
- ✦ No discernible concentration of traffic onto the A453 with flows on rural sections marginally above Do Minimum and 23% above Base Year.
- ✦ Traffic on A453 through Clifton reduced to Base Year level, but likely to exceed capacity of single carriageway after 2011.
- ✦ Environmental conditions through Clifton held at Base Year situation to 2011 and deteriorating thereafter.
- ✦ Adverse environmental impact due to upgrading of existing road in rural areas and need for capacity improvements through Clifton beyond 2011.
- ✦ Traffic flows on A52 Clifton Bridge reduced well below Base Year levels and held at Do Minimum/Base Year levels on Ring Road towards Nottingham Knight and Wheatcroft roundabouts.
- ✦ Good potential for financially viable public transport and area wide reduction of traffic congestion.
- ✦ Demand management measures require community acceptance.
- ✦ Improved accessibility and safety for residual traffic but only in the short/medium term.
- ✦ Significant contribution towards reducing dependence upon the private car



## **THE WAY FORWARD**

No decisions have been made as to the preferred option and none will be made until we have all the results of consultation to hand. At the exhibitions we hope to generate an inclusive environment to encourage all stakeholders to participate.

In parallel with public consultation we will continue our ongoing liaison with transport providing bodies such as the Strategic Rail Authority, Highways Agency, Public Transport Operators and also with the Study Wider Reference Group. We are also seeking the formal view of Local Authorities. Analysis of the comments from all parties will help us identify the Preferred Option.

In parallel with consultation the study team will undertake increasing depth of assessment under the five headings specified by government namely, environment, safety, accessibility, integration and economy. We will also be compiling a programme of implementation seeking to identify measures to address the most crucial problems early and to ensure the deliverability of the whole package.

The study team expect to submit their final report early in April 2002.



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**APPENDIX A**

**CONSULTATION**

**THE WIDER REFERENCE GROUP OPTION SEMINAR**

**WIDER REFERENCE GROUP  
- OPTIONS SEMINAR**

On 26th September, the Trent Bridge Cricket Club in Nottingham played host to 59 delegates for the 3rd Wider Reference Group Seminar organised by the A453 study team.

Following on from Inception, and Strategy Development, this seminar concentrated on the Option Identification and Appraisal process itself and sought views on the Initial Options arising from the work carried out up to that date.

Several common themes emerged as follows:-

- ✧ the 'hearts and mind' measures such as education, commuter plans, fuel duties, taxation etc. were seen to be particularly complex and sensitive, but relevant to possible solutions,
- ✧ it was acknowledged that the transport problems in the study area were complex and would not be solved by single interventions,
- ✧ there was support for taking the longer view and planning for the longer term,
- ✧ there was concern about the long lead time for major infrastructure projects,
- ✧ it was felt that Options should include phasing of implementation to provide some early benefits without compromising later schemes,
- ✧ it was hoped that the broader inclusive approach of this Multi-Modal Study would be reflected in corresponding attitudes in Statutory Procedures and Approvals.

Other outcomes from the Seminar included: -

On emerging solutions:

- ✧ The secondary or consequential changes in traffic should be properly assessed.
- ✧ The link between land use planning and the highway and NET schemes is important for Rushcliffe and requires constructive evaluation.
- ✧ There were mixed views about highway solutions, but perhaps more support than opposition for some further road building, as part of a mixed option.
- ✧ There was a range of views on a preferred option. If there was any discernible consensus it was for a mixed strategy based on the moderate public transport approach, but with some more highway improvement which would include measures for the benefit of buses

More Specific issues:

- ✧ A solution to safety problems on A453 should be prioritised and if necessary proceed independently of consideration and implementation of the rest.
- ✧ Development of East Midlands Airport and the surrounding area was still a concern within the context of the Study.
- ✧ There was no apparent preference between the on-line Red Route and the eastern bypass Yellow Route for the A453 at Clifton, together with a feeling that neither were very satisfactory and if a choice had to be made it could be outside the Study, reflecting the widespread interest in this particular issue.
- ✧ There was general support for rail and bus schemes, but concern about the ability to co-ordinate planning and deliver schemes.



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- ✦ There was wide support for integrated ticketing.
- ✦ There was general support for speed limits with enhanced enforcement.
- ✦ There were many suggestions for individual features or aspects of schemes to be taken into account, and several new schemes were suggested.

Just as at previous WRG Seminars the output more than justified the event and has proved immensely helpful in the ongoing study process.

Our thanks to all who participated and their sponsors.



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**APPENDIX B  
COMBINED OPTIONS  
INITIAL MODEL TEST RESULTS**

**COMBINED OPTIONS  
INITIAL TEST RESULTS**

**2011 AM Peak Hour Analysis**

**Reference Screenlines (Inbound)**

**Traffic and Passenger Flows**

		<b>BY</b>	<b>DM</b>	<b>A</b>	<b>B</b>	<b>C</b>
<b>Outer</b>	<b>Pr</b>	<b>7450</b>	<b>8550</b>	<b>8050</b>	<b>9650</b>	<b>8450</b>
	<b>Pt</b>	<b>2670</b>	<b>3515</b>	<b>4465</b>	<b>3565</b>	<b>4025</b>
<b>Inter</b>	<b>Pr</b>	<b>9850</b>	<b>11150</b>	<b>7400</b>	<b>12000</b>	<b>9200</b>
	<b>Pt</b>	<b>4000</b>	<b>4775</b>	<b>7265</b>	<b>4835</b>	<b>6530</b>
<b>Inner</b>	<b>Pr</b>	<b>9250</b>	<b>10550</b>	<b>7050</b>	<b>11250</b>	<b>8700</b>
	<b>Pt</b>	<b>4750</b>	<b>4940</b>	<b>7385</b>	<b>5020</b>	<b>6665</b>

**Changes from Do Minimum (%)**

		<b>BY</b>	<b>DM</b>	<b>A</b>	<b>B</b>	<b>C</b>
<b>Outer</b>	<b>Pr</b>	-	-	-6	13	-1
	<b>Pt</b>	-	-	27	1	15
<b>Inter</b>	<b>Pr</b>	-	-	-34	8	-17
	<b>Pt</b>	-	-	52	1	37
<b>Inner</b>	<b>Pr</b>	-	-	-33	7	-18
	<b>Pt</b>	-	-	49	2	35

**A453 Links (Inbound)Traffic Flows**

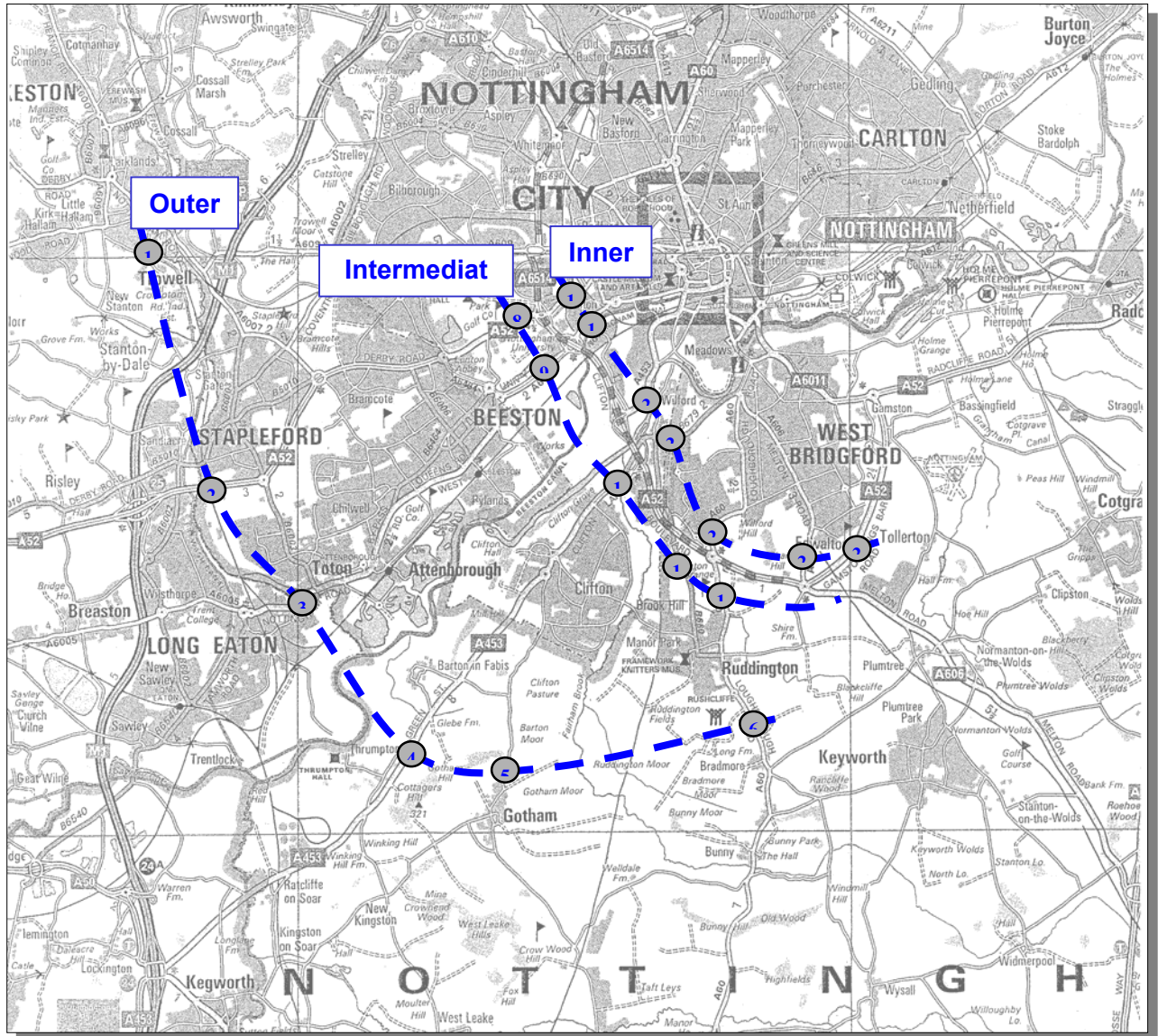
	<b>BY</b>	<b>DM</b>	<b>A</b>	<b>B</b>	<b>C</b>
<b>Thrumpton</b>	<b>1100</b>	<b>1250</b>	<b>2100</b>	<b>2950</b>	<b>1350</b>
<b>Clifton - NTU</b>	<b>1650</b>	<b>1800</b>	<b>1150</b>	<b>1250</b>	<b>1650</b>
<b>Clifton - S'Dale</b>	<b>2700</b>	<b>3050</b>	<b>1650</b>	<b>2250</b>	<b>2400</b>
<b>Queens Drive</b>	<b>2400</b>	<b>2500</b>	<b>1500</b>	<b>2800</b>	<b>1950</b>
<b>Bypass</b>	-	-	<b>1000</b>	<b>2500</b>	

**A52 Links (Northbound)Traffic Flows**

	<b>BY</b>	<b>DM</b>	<b>A</b>	<b>B</b>	<b>C</b>
<b>Clifton Bridge</b>	<b>5000</b>	<b>5250</b>	<b>3750</b>	<b>5350</b>	<b>4400</b>
<b>Clifton to Bypass</b>	<b>2900</b>	<b>3050</b>	<b>2150</b>	<b>3200</b>	<b>3000</b>
<b>Bypass to Knight</b>			<b>3100</b>	<b>3500</b>	
<b>Knight to W'Croft</b>	<b>2300</b>	<b>2400</b>	<b>2300</b>	<b>2550</b>	<b>2400</b>

Key: BY Base Year (2000)  
 DM Do Minimum (2011)  
 A,B,C Options (2011)  
 Pr Traffic Flows (vehicles per hour)  
 Pt Public transport passengers per hour  
 Reference Screenline see overleaf

**REFERENCE SCREENLINES**



**Information Note:**

Reference Screenlines are imaginary lines drawn across a study area so that road traffic and public transport passenger movements may be compared at common points for different scenarios or options.

Flows may be compared on individual roads and routes, for corridors comprising a number of routes or for total screenline crossings.