

**REPORT TO: PLANNING AND TRANSPORTATION COMMITTEE
25 AUGUST 2003**

**REPORT ON: BRINGING CONFIDENCE TO PUBLIC TRANSPORT FINALISED
PROPOSALS**

REPORT BY: DIRECTOR OF PLANNING AND TRANSPORTATION

REPORT NO: 444-2003

1 PURPOSE OF REPORT

1.1 The Scottish Executive awarded Dundee City Council £2.31 million from the Public Transport Fund to develop improved public transport facilities in the city centre and at Ninewells Hospital. The Ninewells Hospital facilities are presently being implemented and this report considers the proposals for the city centre. Detailed proposals for the city centre have been developed and subjected to extensive public consultations. This report outlines the development of these proposals, the results of the consultation exercise and recommends a proposed scheme to proceed to implementation.

2 RECOMMENDATIONS

2.1 It is recommended that Committee

- a approves the proposed scheme as outlined in Section 11 of this report; and
- b remits the Director of Planning and Transportation to implement the proposals.

3 FINANCIAL IMPLICATIONS

3.1 The full costs of the proposed scheme will be met from the successful PTF Bid of £2.31 million across the financial years April 2002 – March 2005.

4 LOCAL AGENDA 21 IMPLICATIONS

4.1 The proposals to be implemented from this successful bid are aimed at encouraging modes of transport other than the car and as such will contribute to the protection of Dundee's environment.

5 EQUAL OPPORTUNITIES IMPLICATIONS

5.1 The proposals are aimed at improving public transport for the benefit of all Dundee's citizens, whether or not they have access to a car or are able bodied or have a disability, thus ensuring Dundee's transport network caters for all.

6 BACKGROUND TO PROPOSALS

6.1 This project is about improving facilities for the 10 million bus users who travel to and from the city centre annually including the 12,000 users who travel to and from the Whitehall area daily to work, shop and visit. The BCPT package will provide two key improvement elements, firstly, improved facilities in the form of new high quality on-

street bus passenger facilities in the city centre at Whitehall Street/High Street, St Andrew's Street and Victoria Road, and secondly, a step change in the quality and quantity of service information available to public transport users.

- 6.2 Following the award by Scottish Executive for this initiative, given the title "Bringing Confidence into Public Transport" (BCPT), the Committee was advised at its meeting on 24 June 2002 that because of the highly sensitive nature of the Whitehall Street area, its historical significance and the need to protect the quality streetscape, a design competition to provide high quality facilities in the city centre as part of the BCPT project should be held. A Steering Group was set up to take forward the BCPT project comprising officers from Planning and Transportation and Environmental and Consumer Protection Departments and project management consultants JMP.
- 6.3 A Brief for the Design Competition was prepared, in order that the individual planning, environmental, operational and financial constraints of the various locations could be properly addressed. The Brief outlined a number of study objectives and asked that two particular issues should be fully addressed.
- a The Designer was required to demonstrate that the design of the public transport interchanges takes cognisance of existing environmental issues including air quality, noise and visual impact, and that the final design would mitigate any environmental impacts; and
 - b In respect of Whitehall Street in particular, the design of any bus waiting facilities should not in any way dominate the street. The importance of the special architectural and townscape quality of the Whitehall Street/Crescent area was given particular emphasis in the Brief.
- 6.4 Members will recall that at the Planning and Transportation Committee held on 2 December 2002, local architects Nicoll Russell Studios were appointed. Report No 799/2002 refers.

7 DESIGN PROPOSALS

- 7.1 Following their appointment, Nicoll Russell Studios developed proposals with a view to the Planning and Transportation Department carrying out an extensive public consultation exercise during March of this year. Also in terms of dealing with the environmental issues of air quality and noise, the proposals would be extensively tested.
- 7.2 The proposals that were developed for consultation purposes for the three city centre locations are summarised as follows:
- 1 Victoria Road – the replacement of the four present shelters at the Victoria Road stances north of the Wellgate Centre with new high quality shelters.
 - 2 St Andrews Street – the provision of a new stance and high quality shelter northbound on a widened footway.

Note: As no issues have emerged from the consultation exercise for the Victoria Road and St Andrews Street locations, this report will therefore concentrate on the Whitehall Area.

- 3 Whitehall Area which includes High Street, Crichton Street, Nethergate and Whitehall Street:

High Street

- the provision of four new high quality shelters and stances to replace the existing three at Littlewoods for eastbound services.

Crichton Street

- the provision of two high quality shelters and stances to replace the existing two shelters in Crichton Street for eastbound services.

Nethergate

- the provision of two high quality shelters to replace the two existing shelters for Nethergate westbound services.

Whitehall Street

- the provision of four stances and three high quality shelters on a widened west footway for westbound services;
- the removal of a through vehicle lane to allow the widened footway and prevent double parking;
- the removal of general traffic with the exception of buses and service vehicles;
- the removal of the metered car parking and disabled bays, to be replaced with loading only bays adjacent to the east footway;
- the provision of new high quality shelters incorporating eight metre high exhaust emission masts and acoustic absorber blocks, but to a complementary design; and
- the re-routing of buses from Union Street to Whitehall Street, increasing the peak hour flow from 41 to 74 buses.

General Proposals

- the provision of real time information and journey planning facilities at all stances;
- the provision of addition passenger transport information at several other locations; and
- associated footway widening and streetscape improvements.

- 7.3 For the shelter design, the architects developed an attractive light transparent glazed enclosure in a curvilinear shape to better respond to pedestrian movement. However to address the requirements of the brief in terms of air quality and noise attenuation, a more solid looking acoustic noise absorber and eight metre high mast incorporating an exhaust extractor, formed part of the shelter design for consultation purposes. The design proposed that exhaust fumes would be drawn via grilles in the street and cleaned through filters before being expelled at a higher level for more efficient dispersion. The outcome of the testing of these environmental measures is summarised later in this report and described in more detail in the appendices. The

other features of the design are the use of standard glazing panels for easy replacement, supported from a granite plinth, and a leaf shaped composite panel roof incorporating planters. It is the intention that the shelters will be located on widened footways built to a high quality specification and palette of materials eg Caithness Stone and granite to match the city centre's award winning environmental improvements. The kerblines will be set out in a shallow 'saw tooth' arrangement which allows buses to be more easily presented to the stances. Bus boarders to ease pedestrian and disabled access onto buses will also be incorporated.

8 CONSULTATION PROCESS

8.1 The following events and actions have contributed to the public consultation process:

- 1 Presentations to:
 - Council Members;
 - City Centre Initiative Group (CCIG);
 - City Centre Action Group (CCAG); and
 - Whitehall Street businesses.
- 2 A public exhibition of the proposals.
- 3 Letters to Whitehall Street residents.
- 4 Meetings with Dundee Civic Trust and Historic Scotland.
- 5 Local press articles and letters.

8.2 The presentations were made in four parts. Firstly an explanation of the origins and funding of the BCPT project, secondly an explanation of why certain streets were selected to accommodate stances rather than others (eg why Whitehall Street as opposed to Union Street and why not Shore Terrace), thirdly a detailed description of the proposals and finally information on real time information and journey planning.

8.3 Members will recall that before the proposals were even designed, there was considerable press speculation and resultant public concern that Whitehall Street was going to become an open air bus station. Judging from reaction since the proposals became public, the initial fears of the general public have been allayed, and there is a general acceptance that Whitehall Street will not become a 'bus station' and that bus users would be best served by buses running through this area. Although, the city centre's business community are supportive of the proposals, there remains some detailed concerns, from the Whitehall Street businesses. On the other hand, there has been little reaction from Whitehall Street residents.

8.4 A full list of the various comments is provided in the attached appendices. However, a summary of the main concerns is as follows:

- The Union Street buses should not be re-routed through Whitehall Street;
- Whitehall Street could give the perception of being a bus station and therefore general traffic should be allowed to continue to use the street;
- Removal of on street parking would affect trade;
- The proposals may cause servicing difficulties, particularly to the future redevelopment of the former Debenhams;
- The noise from running engines from stationary buses; and

- The visual impact of the acoustic absorber blocks and eight metre high exhaust masts and that these expel gases at first floor level.

9 RESPONSE TO CONSULTATION COMMENTS

- 9.1 The reinstatement of a setted surface in Union Street is essential to protect the long term integrity of the Outstanding Conservation Area in the city centre as this is a very historic street surface. However, at present there is no specification currently available for a setted surface which can properly accommodate buses, and therefore buses in Union Street will have to be re-routed. In the longer term, however, it may be possible to allow buses back in to the street. A fuller explanation of the Union Street problems is contained in the appendices.
- 9.2 One of the reasons for the design competition being held was to seek the highest quality in terms of overall design of both shelters and streetscape and thus avoid creating the impression of a bus station. However, if the only vehicles present in the street are buses the impression could be gained by some members of the public that a de-facto bus station was being created.
- 9.3 There is considerable evidence gathered over many years of pedestrianisation experience that the removal of through traffic and on street parking in streets does not affect trade. Also, from the surveys that were carried out to assess servicing patterns in Whitehall Street, it was observed that only 7% of people entering the shops had come from a vehicle parked in Whitehall Street. It should also be noted that 40% of the vehicles parking in Whitehall Street did so illegally.
- 9.4 Although not a problem at present whilst Debenhams remains vacant, servicing of this building is recognised as a potential problem for the longer term and the inclusion of a loading bay on the west side of the street should be sought.
- 9.5 Ways of insisting that drivers switch off engines are presently being investigated. These include signage, the presence of inspectors and possibly fines, and the use of current legislation.
- 9.6 Following detailed testing of the proposed vehicle emissions cleaning and noise attenuation measures, it would appear that their success is only limited in terms of value for money (see Section 10 below). It is therefore appropriate that the visual impact of these elements requires to be reviewed.

10 NOISE AND AIR QUALITY ENVIRONMENTAL CONSIDERATIONS

- 10.1 These are considered in more detail in the attached Appendices 4 and 5.
- 10.2 **Noise** – Through public consultation, it has been identified that there are concerns about the visual impact of the acoustic absorbers at the stances. This method of noise control will provide a small reduction in noise, but only for passengers when boarding the buses. However, on the west pavement, due to the noise barrier effect created by the stances, the pavement area behind the stances will benefit from a significant reduction in bus noise. This will hold true even when the buses are re-routed from Union Street. On the east side of Whitehall Street, however, there will be a very slight increase in noise levels when the Union Street buses are re-routed. The west side comprises a mixture of stances and open kerbside ie areas protected and unprotected from noise, hence the bus noise will vary. This can be averaged to show

a small but significant reduction in noise along the length of the street, however, in those areas of open kerbside not behind stances, the noise levels will increase. The areas protected from bus noise will be behind stances. In those areas where there are no stances there will be no protection from the bus noise. When this is averaged along the entire length of the street, a small but significant reduction in noise levels can be achieved without the introduction of the acoustic absorbers at the stances. Encouraging/requiring drivers to switch off engines whilst at the stop will result in a further reduction in the overall noise levels.

- 10.3 **Air Quality** – the Report on the Local Exhaust Ventilation system (LEV) has concluded that the capturing and filtering of exhaust emissions is feasible with up to 75% efficiencies, but only in terms of a bus exhaust positioned with a good degree of accuracy over the extractor and under negligible wind conditions. These efficiencies are likely to fall dramatically with small displacements between exhaust and extractor. Maintenance costs and required maintenance frequency are high. The report also recommends that much further research is required as there are so many variables, such as wind and weather conditions, engine performance, position of exhaust etc. It should also be remembered that the LEV system only deals with exhaust gases from stationary buses sitting on stances with their engines running. LEV would not assist through buses or buses moving onto and accelerating off stances. Considering the above efficiencies, it is estimated that the LEV might only treat 24.2% of the total exhaust gases emitted into Whitehall Street.
- 10.4 Various standards are being implemented throughout Europe through time to improve exhaust emissions. Euro 4 comes into force in 2005 and will cut polluting emissions for new engines by 60% from those engines presently in use. Ultimately, Euro 5 will cut emissions by up to 90%. Also, Government Grants are currently available to facilitate the introduction of catalytic converters to improve emission standards. It would seem therefore that tackling the problem at source by encouraging or requiring the bus companies to fit these converters would be far more beneficial to the city as a whole and a useful interim measure until the full Euro standards come into play.
- 10.5 It would therefore appear that there are many uncertainties and variables with the proposed LEV's:
- they would treat only a small percentage of emissions and only in Whitehall Street;
 - they would become redundant in a few years once Euro standards are implemented;
 - there are concerns about the visual impact of the 8 metre high exhaust masts;
 - the Whitehall Street businesses are concerned about the dispersal of exhausts at upper floor levels;
 - there are other less costly short term measures such as fitting converters to buses which would be of a more effective use to the city as a whole; and
 - encouraging or even enforcing drivers to switch their engines off at stances would be more effective to Whitehall Street.
- 10.6 It is therefore recommended that the implementation of the LEV system would not represent good value for money and that the installation of particulate traps and catalytic converters on all relevant buses be pursued as an alternative.

- 10.7 The Head of Environmental Health and Consumer Protection has been consulted on this report and has raised a number of air quality considerations concerning the Whitehall area. Members will recall that Dundee City Council Local Authority Air Quality Updating and Screening Assessment (Report No 310-2003) identified that the nitrogen dioxide pollution levels within Whitehall Street are currently borderline. This scheme may cause an increase in traffic pollution which, if not sufficiently mitigated, could result in the need to declare an Air Quality Management Area within central Dundee.

11 RECOMMENDED PROPOSALS

- 11.1 Plans and illustrations of the proposals are available in the Members Lounge and will be displayed at Committee. See Table at Appendix 6 for a comparison of the original proposal and scheme recommended for implementation.
- 11.2 For the Victoria Road, St Andrews Street, High Street, Crichton Street and Nethergate it is recommended that no changes be made to the scheme put forward for consultation.
- 11.3 For Whitehall Street and Union Street:
- the provision of three stances within Whitehall Street each with three high quality shelters and a layover stance for buses waiting to access occupied stances. The layover point may eventually become a loading bay for the redevelopment of former Debenhams but this is dependent on Union Street being reconstructed to take buses as funds allow in future (subject to further agreement with the bus companies);
 - the removal of one of the two existing through vehicle lane to allow the widened footway and prevent double parking;
 - general traffic and buses to remain to be permitted to use Whitehall Street;
 - the removal of some of the metered parking bays to be replaced with loading bays adjacent to the east footway and the retention of an existing disabled bay and two metered parking bays, plus the provision of a new disabled bay immediately nearby in Whitehall Crescent. Allow the loading bays to be used for overnight residential parking between 6.00pm – 9.00am. (NB if metered spaces remain, double parking for loading will continue and buses will be unable to pass).
 - the basic design of the shelters and streetscape improvements is to remain largely unchanged. However, the acoustic absorbers and exhaust masts are to be deleted to be replaced by other solid and vertical elements but to a reduced scale, as these form part of the architectural integrity and quality of the original design;
 - the re-routing of buses from Union Street (until Union Street is reconstructed to a suitable standard); and
 - general proposals – the provision of real time information, journey planning, footway widening and streetscape improvements.
- 11.4 It is considered that following the outcome of the public consultations the recommended scheme has taken account of many of the concerns:

- the Council is prepared to look at allowing buses to use Union Street in future, but only if the setted surface can be maintained in some form and to a construction specification that can accommodate buses. This is to be pursued;
- maintaining general traffic access in Whitehall Street will remove the perception that it is to become a bus station;
- cars will be able to occupy the loading bays for the purposes of loading and unloading, thus addressing a concern of some of the local traders;
- the lack of a loading bay for the west side of the street was a further concern. Its provision in the longer term is possible once Union Street is available for bus use; and
- ways of encouraging or requiring drivers to switch off engines whilst on stances are to be rigorously pursued. Reducing the number of shelters from four to three and reducing the scale and size of the acoustic absorbers and exhaust stacks should help alleviate the concerns of those worried about the visual impact of the shelters.
- the provision of cleaner bus engines will also be rigorously pursued by installing particulate traps and ensuring all vehicles meet future European union standards for exhaust emissions.

12 CONSULTATIONS

- 12.1 The Chief Executive, Depute Chief Executive (Support Services), Depute Chief Executive (Finance) and Assistant Chief Executive (Community Planning) have been consulted and are in agreement with the contents of this report. The Head of Environmental & Consumer Protection has been consulted and is concerned that the existing Nitrogen Dioxide levels in the Whitehall area are currently borderline. The Council's detailed Air Quality Assessment will determine any need to declare an Air Quality Management Area. Any such declaration will result in the Council having to provide an Action Plan requiring mitigating measures necessary to improve air quality.

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18 August 2003

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APPENDICES

1 The following appendices are included in this report:

- Public Consultations Responses;
- Union Street;
- Noise pollution in Whitehall Street;
- Air quality in Whitehall Street; and
- Table comparing original scheme and amended proposals.

2 Public Consultation Responses

2.1 Council Members – Seven Councillors attended the presentation. There was general agreement on the proposals. However, there were concerns expressed, particularly by the Local Member, that other streets particularly Union Street should be available for bus use together with Whitehall Street (Union Street is considered in Section 3 of the appendices). Further it was felt by some Members that the removal of cars from Whitehall Street would give the Street the perception of a bus station. Access and servicing of premises were also questioned. The visual impact of the proposals, particularly the acoustic absorber and exhaust emission extractor elements, and the noise from running engines were further concerns.

2.2 City Centre Initiative Group (CCIG) and City Centre Action Group (CCAG) – The CCIG is a core group of the CCAG. The CCAG is a private led Dundee Partnership group whose agreed objective is to encourage representatives of the private and public sectors to act together to develop the economic potential of the city centre. The Groups views on BCPT are therefore very important. Following the presentation, the Chair of the Group advised by letter that having considered the various operational options, the rights of the bus companies, access and safety, minimising disruption to businesses and residents, and urban and design quality, the Group generally accepted that the proposals consisted of the best options available. This outcome was conveyed via the CCAG Newsletter to over 100 city centre businesses, with no further response. Two leading city centre retailers also spoke publicly through the local press in support of the proposals. Only three members of the 100 or so membership of the CCAG attended a presentation. It was thus concluded that the CCAG membership had no great concerns with the proposals.

2.3 Whitehall Street Businesses – Five of the 23 Whitehall Street retailers and businesses attended a presentation at DCA. Despite being invited, no residents attended. The businesses accepted that public transport is vital to the functioning of the city centre, that buses have to pass through this area and that Shore Terrace was no longer practicable. They also welcome the proposed provisions for improved passenger information. However, the traders basic concern was the re-routing of the Union Street buses through Whitehall Street. They do not object to Whitehall Street being used by buses but increasing the number was unacceptable and they ask for Union Street to be reconstructed to permit bus use. The businesses also feel that the form of Whitehall Street makes it particularly difficult to deal with air quality compared with Union Street. The proposed solution to expel exhaust gases at first floor level gave great cause for concern. Also they feel that the proposed acoustic absorbers negate the light fluid appearance of the shelters and do nothing to enhance the streetscape. The businesses feel that the visual implications of the proposals are at odds with planning policies particularly those related to environmental and residential policy eg the desire to seek more residential use within

the city centre. The businesses believe that the proposals will make the servicing of premises on the west side of the street impossible and the servicing of premises on the east much worse. Two traders are concerned that the loss of car parking may have a detrimental effect on trade.

- 2.4 A Public Exhibition of the proposals was held in the Overgate. Planning and Transportation staff attended on several occasions to answer queries. Approximately 50 members of the public raised questions and sought further information but generally were supportive of the proposals. From observation by Council staff and the Overgate Management, the Exhibition seems to have been well attended. Written comments were invited but none were received.
- 2.5 Whitehall Street Residents – Letters were sent to all 12 households in Whitehall Street advising them of the proposals and the public exhibition dates, inviting residents to a presentation to be made to Whitehall Street traders and inviting residents to make comments in writing to the Department. Two residents found the general design and features satisfactory, but are particularly concerned about increasing the number of buses, and the removal of parking and loading.
- 2.6 Dundee Civic Trust objected at their AGM to Whitehall Street being used for a bus interchange purely on the impact of buses on the Street in architectural and townscape terms and without having seen any details of the proposals being put forward for consultation. The Civic Trust subsequently wrote on 24 April with more or less the same response as the Whitehall Street businesses following the publication of the proposals and exhibition.
- 2.7 Historic Scotland advised that care should be taken regarding the positioning of shelters in relation to the façade feature doorways.
- 2.8 Local Press Articles and Letters – The considerable local press interest has ensured that in consultation terms the proposals being put forward for consultation will have reached a wide audience. Most of this related to the impact of the proposals on Whitehall Street but were made before any details of the proposals were known amid fears that the proposals related to Whitehall Street only and Whitehall Street was to become an open air bus station. There was also a misconception that no other options were to be considered. The presentations to groups and the public exhibition stressed that other options were considered and provided reasons why the present proposals are being put forward as the Councils preferred option. It was also stressed that the proposals put forward were for consultation purposes and that all observations would be considered.

3 Union Street

- 3.1 Union Street historically, architecturally and in townscape terms is one of Dundee's most important streets and is within an Outstanding Conservation Area. A major contributory factor to this is that its complete setted surface is one of the few remaining in Dundee city centre. It is therefore considered essential that a setted surface remains for the future. The present setted surface has in recent years failed in several locations and an assessment of this failure carried out by the City Engineer has shown that this corresponds with the routing of buses into the street. In order to protect the setted surface temporarily whilst buses remain in the street, a sacrificial layer of asphalt has been placed over the setts.

- 3.2 The problems with buses running in setted streets are now well documented and have been the subject of a major study by the SCOTS Group who have prepared a Good Practice Guide. However, at present there is no combination of setts, bedding and jointing which would comply with the Guide and therefore the City Engineer recommends that if retention of the setted surface is required then buses should be removed from Union Street. It may be possible in the longer term to replace the surface with new setts to a new construction specification capable of accommodating buses, but the design life of this specification is presently unknown and can only be determined after laboratory testing and field trials.
- 3.3 For these reasons buses cannot remain in Union Street on a permanent basis. The asphalt layer will however be able to accommodate buses temporarily moved out of Whitehall Street when works to provide new stances in Whitehall Street are carried out.

4 Noise Pollution in Whitehall Street

- 4.1 Consultants were commissioned to assess the effect on noise in Whitehall Street of the proposed changes to the bus stances which includes the provision of shelters. Noise measurements were made in Whitehall Street and of individual buses.
- 4.2 If the number of buses remained the same as at present then, due to the partial barrier effect of the bus shelters, there would be a small but significant decrease in bus noise on the west footway and at buildings on the west side of the street.
- 4.3 However, if buses were re-routed from Union Street into Whitehall Street, the overall result, including these extra buses, will be that noise levels will still be slightly lower than at present on the west side though slightly higher on the east side.
- 4.4 The proposed sound absorbent panels will therefore only provide a small reduction of noise and only for people boarding buses.

5 Air Quality in Whitehall Street

5.1 Summary

Within the Bringing Confidence into Public Transport (BCPT) project, innovative trials have been undertaken to develop a local exhaust ventilation system (LEV). This is specifically aimed towards minimising air pollution in Whitehall Street.

The feasibility of capturing exhaust fumes from stationary buses at bus stops has been examined and the extraction of pollutants from these fumes has been assessed for efficiency. Operational and maintenance costs have also been evaluated.

The trials were carried out at the Travel Dundee depot, and independently verified by Dr Michael Mkpadi from Leeds University. Comprehensive reports on the methodology, the results, conclusions and recommendations have been prepared and are attached. ECPD have been involved throughout the process.

The average capture of exhaust fumes under controlled conditions in the experiment was 75%. The filter performance was 99.7% (this relates to PM10 particulates only).

and NOT Nitrogen Dioxide NO₂), therefore combined “cleaning” effect is 75%, assuming no deterioration in performance during the three week life of a filter.

The controlled conditions of the test give more favourable results than could be expected from the street, with the absence of prevailing wind considered an extremely significant factor. Another variable was the position of the exhaust outlet relative to the point of capture which again has a major impact on the performance of the LEV. There are approximately five different vehicles types/exhaust positions in the bus fleet.

Alternatively, particulate traps can be fitted on the vehicle to bus exhausts for a reasonable cost. The Scottish Executive provides 75% grants to bus operators through its “Clean Up” initiative which reduces the cost to approximately £750 per bus fitting. Exhaust fumes would then be cleaned constantly throughout the city on all buses and not just when stationary at stops in Whitehall Street.

In addition, the sole use of Whitehall Street is proposed as a temporary measure at this time, pending suitable reconstruction of Union Street to withstand some bus services activity. It is unlikely however that any of the services which stop in Whitehall Street would be relocated, only those which pass through.

5.2 Conclusion

Although the consultant’s report advises that the LEV achieves a reasonable theoretical improvement in air quality through a reduction in particulates, it does have significant drawbacks;

- a It does not achieve any reduction in Nitrogen Dioxide (NO₂) which is a crucial pollution indicator for the introduction of Air Quality Management Areas;
- b It has only been assessed in controlled conditions and its performance is highly affected by local conditions such as prevailing winds, accurate bus positioning and filter life; and
- c The maintenance costs associated with the LEV are relatively high due to necessary filter replacement and safe disposal.

Given the above, it is considered that the best potential improvement to air quality throughout the city can be achieved through the use of particulate traps on every bus within the city. This would result in an instant reduction in particulate levels not only in Whitehall Street, but throughout the city. Particulate traps also represent greater value for money (in capital and revenue terms) than the LEV proposals.

5.3 Costs

The capital cost of the installation of LEV’s has not yet been determined but will be considerable, albeit funded from the Public Transport Fund Bid for the BCPT project.

The revenue implications are also considerable with each of the LEV units estimated at £5,000 per annum to run and maintain (total revenue costs therefore of **£15,000** per annum). There will most probably be additional costs also for disposal of the filters as they may be classed as hazardous, therefore a licensed site is necessary.

5.4 Recommendations

It is therefore recommended that the BCPT does not use LEV system, but instead pursues the use of particulate traps with the Bus Operators and encourage or require them to update to the latest Euro engines when appropriate. Thus, PM10 and NO2 will be reduced.

If an Air Quality Management Area is declared, this could be used to require bus operators to improve bus engines.

6 **Proposed Amendments**

Whitehall Street

Original Proposal	Proposed Amendment
The provision of four stances and four high quality shelters on a widened west footway.	The provision of three stances with three shelters and one layover point with no shelter. Layover point may later become a loading bay (see Union Street below).
The removal of a through vehicle lane to allow widened footway and prevent double parking and the removal of general traffic with the exception of buses and service vehicles.	General traffic to be permitted to use Whitehall Street.
The removal of the metered car parking bays and disabled bays.	Provision of two disabled bays and two 'pay and display' parking bays.
The provision of loading only bays adjacent to the east footway.	Residents permitted to park overnight in loading bays between 6.00pm and 9.00am and all day Sunday.
New high quality shelters to incorporate eight metre high exhaust emission stacks and acoustic absorber.	Removal of exhaust stacks and acoustic blocks to be replaced by reduced size solid and vertical features.

Union Street: see paragraphs 3.1 – 3.3.

Original Proposal	Proposed Amendment
Removal of existing buses and stance.	Once Union Street is reconstructed to allow buses and setts to coexist, consider allowing some buses to transfer back into Union Street to allow the layover point in Whitehall Street to become a loading bay for former Debenhams retail units.