



HIGHWAYS DEPARTMENT

**GUIDELINES
ON
TRAFFIC IMPACT ASSESSMENT
&
DAY-TIME BAN REQUIREMENTS
FOR
ROAD WORKS ON TRAFFIC SENSITIVE ROUTES**

Highways Department
Guidance Notes No. RD/GN/021

**Guidelines on Traffic Impact Assessment &
Day-time Ban Requirements
for Road Works on Traffic Sensitive Routes**

1. Introduction

- 1.1 In mid 1994 the Road Opening Working Party (ROWP) chaired by Secretary for Works decided to require utility undertakers to carry out Traffic Impact Assessment (TIA) for any proposed utility works on traffic sensitive routes. This requirement was implemented in stages and from April 1995 the TIA requirement applies to 126 roads / road sections. In December 1994 the ROWP decided to ban day time utility works on 45 traffic sensitive road sections. This Guidance Note contains a consolidated guidelines on these two requirements.
- 1.2 The requirements stipulated by ROWP are for utility works. Subsequently Highways Department (HyD) decided to follow the TIA requirement for in-house works and to comply with the day-time ban requirement as far as practicable. It is recognised that it will not be in the interest of the public to restrict certain highway works to night time such as construction of elevated road or road construction.

2. TIA Requirement

2.1 Objective

The main objectives of TIA are

- a) to assess the anticipated traffic implications of carrying out road works;
- b) to devise appropriate temporary traffic management measures to ameliorate the traffic impact of the road works.

2.2 List of roads affected

The list of roads where TIA requirements shall apply is given in Appendix 1 and includes Red Routes and Pink Routes and some other traffic sensitive routes.

2.3 Types of works affected

The TIA requirement shall apply to the following types of works which will affect vehicle movements including works on footways involving diversion of pedestrians onto the adjoining carriageway -

- a) any works requiring an excavation permit from the HyD including but not limited to utility works implemented by utility undertakers and road opening works by other public bodies or private developers; and
- b) HyD capital works projects, road improvement works and maintenance works.

2.4 Exemption

Exemptions will not generally be allowed. Exceptional application for exemption should be submitted to the concerned Traffic Engineering (TE) Division of Transport Department (TD) on a case by case basis. The limited circumstances where exemptions have been granted are as follows:

- a) Emergency works (for utility works, the list of emergency works agreed between utility undertakers and HyD shall apply).
- b) Works involving night work only are generally exempted except a few critical routes such as Cross Harbour Tunnel Approach Roads. The concerned TE Division of TD must be notified and consulted in advance. Night work is defined as work within the following period -
2200-0600 hours for Strategic Road Networks (SRN)¹
2000-0600 hours for other roads.
- c) Works which is expected to cause minimal impact to traffic flow as confirmed on a case by case basis by the concerned TE Division of TD. Despite the exemption on TIA requirement, the day-time ban requirement may still apply to such works. Examples are routine road lighting maintenance works such as lamp replacement, lantern cleaning, pole painting and mechanical pole testing and lighting works where excavations are carried out in the pedestrian ways and outside the peak periods which are 7am - 10am and 4pm - 8pm in general.

2.5 Procedures

- a) A TIA Report outlining the findings and recommendations of the TIA shall be prepared. Guidelines on preparing TIA Reports (including estimation of road capacity) are given in Appendix 2.
- b) One copy of TIA Report shall be submitted to the concerned TE Division of TD with copy sent to the Commissioner of Police, and if the proposed works is within the Area Traffic Control areas to the Area Traffic Control Division of TD.

¹ SRN consists of both rural and urban trunk roads which generally have route numbers assigned to them

- c) The concerned TE Division of TD will normally reply within three weeks after the submission.
- d) Applications for excavation permits will not be processed until the related TIA Report has been approved by TD.
- e) For capital works projects, assessment of traffic impact shall be carried out during the planning stage in consultation with TD and the Commissioner of Police. Depending on the complexity of any traffic management measures required, it may be necessary to set up a Traffic Management Group at the construction stage to consider and fine tune those measures.

3. Day-time Ban Requirement

3.1 Objective

The objective is to restrict works to outside day-time hours to avoid disruption to peak hour vehicular traffic. Day-time hours mean 0700 to 1900 hours.

3.2 List of roads affected

The list of roads where day-time ban shall apply is given in Appendix 1. The day-time ban road sections overlap partly with the TIA routes. Those TIA routes with part sections falling within the day-time ban list are marked as "part length day-time ban" in Appendix 1.

3.3 Types of works affected

The day-time ban requirement shall apply to the following types of works which will affect vehicle movements including works on footways involving diversion of pedestrians onto the adjoining carriageway -

- a) any works requiring an excavation permit from the HyD including but not limited to utility works implemented by utility undertakers and road opening works by other public bodies or private developers; and
- b) HyD capital works projects, road improvement works and maintenance works.

3.4 Exemption

Exemption will not generally be allowed but the followings have been exempted:

- Emergency works (for utility works the list of emergency works agreed between utility undertakers and HyD shall apply), provided that the

work is carried out round the clock, unless technically not possible, until completion of emergency repairs.

- Works on Sundays and public holidays but excluding works on -
 - Strategic Road Networks;
 - Chatham Road South;
 - Clearwater Bay Road;
 - Nathan Road;
 - Repulse Bay Road;
 - Sai Sha Road and
 - Salisbury Road.

- Works on footways without encroachment (including diversion of pedestrian) onto the adjoining carriageway. In such case, stopping any construction vehicle by the kerb side for loading/unloading during day-time is not permitted.

Exceptional application for exemption should be submitted to the Regional Offices of HyD who will seek the agreement of TD and Commissioner of Police before granting approval. In general the following will be exempted:

- a) Works or certain parts of works which cannot be completed during a night shift or during public holidays and it is not practical to deck over the excavation at day-time, such as
 - full depth reconstruction of roads; and
 - curing of concrete carriageway

subject to appropriate traffic management measures acceptable to TD and the Commissioner of Police.

- b) Works with virtually no adverse effect to the traffic even carried out at day-time, for instance, tram track renewal works along tram reserve.

- c) Airport Core Projects, Airport Railway Projects, HyD capital works projects, and HyD maintenance and improvement works where
 - full TIA has been carried out to derive traffic management proposal acceptable to TD and Commissioner of Police;
 - it is not in the interest of the public to restrict such works outside day-time hours.

Examples are traffic improvement works required by TD and routine maintenance work for expressways under cyclic lane closure programme acceptable to TD and the Commissioner of Police.

- d) Other works confirmed by HyD on a case by case basis on technical grounds.

3.5 Procedures

- a) For proposed works on day-time ban roads, Excavation Permit applicants shall indicate in their applications whether they intend to carry out the work at night (or on Sundays, public holidays) and provide details showing how they propose to deck over any excavation on the carriageway during day-time.
- b) For in-house HyD works, officers concerned shall take into account this requirement in planning and in liaison with other departments.

4. Construction Noise Permit

- 4.1 It is expected that the TIA and day-time ban requirements will result in more road works to be carried out at night or on Sundays and public holidays. Despite these requirements, contractors will still have to obtain Construction Noise Permit (CNP) from Environmental Protection Department (EPD) for working within the restricted hours under the Noise Control Ordinance.
- 4.2 Contractors must be reminded to adopt low noise construction methods during restricted hours. Conditions on allowable working periods, the powered mechanical equipment to be used and noise control measures etc will be imposed by EPD, depending on the estimated noise impact to the nearest noise sensitive receivers. Enforcement action will be taken against contractors who do not follow the conditions of the CNP. The Practice Note prepared by EPD at Appendix 3 is a useful guide for promoters and contractors of road excavation works in their application for CNPs.

5. Temporary Decking over Trenches on Carriageways

- 5.1 The TIA and day-time ban requirements may require trenches on carriageways to be decked over during day-time to maintain traffic flow. To avoid reduction in road capacity, the temporary decking shall be constructed to avoid the need for vehicles to slow down when passing over the decking. Unless there are practical difficulties the top of the temporary decking shall be flush with the adjoining road surface. A typical construction of the decking is shown in Appendix 4.
- 5.2 Any protruding decking on TIA or day-time ban roads shall be marked on the surface by alternate black and yellow diagonal strips of 300mm width and an "Uneven Road" sign (sign 434) provided to warn motorists of its presence. The yellow markings shall have skid resistance and reflectivity characteristics equivalent to common thermoplastic road markings.

- 5.3 The temporary decking shall always be secured in position and covering the whole area of the trench on carriageway without causing any danger to road users.

Research and Development Division
Highways Department
July 1995

TIA and Day-time Ban Routes in Hong Kong Island (September 2011)

Roads in HK Island		Route	TIA	Day-time Ban
HK1	Aberdeen Main Road	Pink	Full length	--
HK2	Aberdeen Praya Road	Pink	Full length	--
HK3	Aberdeen Tunnel	Red	--	Full length
HK4	Ap Lei Chau Bridge Road (Ap Lei Chau Bridge included)	Red	--	Section between Ap Lei Chau Drive and Wong Chuk Hang Road
HK5	Arsenal Street	--	--	Section between Hennessy Road and Lockhart Road
HK6	Belcher's Street	--	Full length	--
HK7	Bonham Road	--	Full length	--
HK8	Cadogan Street	--	Full length	--
HK9	Caine Road	--	Full length	--
HK10	Canal Road Flyover	Pink	Full length	--
HK11	Canal Road East	--	--	Section between Sharp Street East and Leighton Road
HK12	Catchick Street	--	Full length	--
HK13	Connaught Place	--	Section between Pedder Street and Man Yiu Street	--
HK14	Connaught Road Central	Red	Full length	Full length
HK15	Connaught Road West	Red & Pink	Full length	Section between Des Voeux Road West and Connaught Road Central
HK16	Cotton Tree Drive	Pink	Full length	Section between Harcourt Road and Queensway
HK17	Des Voeux Road Central	--	Full length	--
HK18	Des Voeux Road West	--	Full length	--
HK19	Electric Road	--	Full length	--
HK20	Fleming Road	--	--	Full length
HK21	Forbes Street	--	Full length	--
HK22	Garden Road	Pink	Full length	--
HK23	Gloucester Road	Red	Section between Victoria Park Road and Harcourt Road	Section between Victoria Park Road and Harcourt Road (note: service road is included)
HK24	Harcourt Road	Red	Full length	Full length
HK25	Hill Road Flyover	Pink	Full length	Full length
HK26	Hing Fat Street	--	Full length (note: portion between King Ming Road and the pier is excluded)	--
HK27	Island Eastern Corridor	Red	Full length	--
HK28	Java Road	--	1. Section between Health Street East and King's Road 2. Section between Tong Shui Road and Kam Hong Street	--
HK29	King's Road	--	Section between Hing Fat Street and Hong On Street	--
HK30	Man Kwong Street	--	--	Section between Man Po Street's temporary connection and Man Yiu Street
HK31	Man Yiu Street	--	Full length	--

Roads in HK Island		Route	TIA	Day-time Ban
HK32	Marsh Road	--	--	Section between Hennessy Road and Lockhart Road
HK33	Morrison Hill Road	--	Full length	1. Section between Queen's Road East and Canal Road West 2. Section between Canal Road West and Wan Chai Road
HK34	New Praya, Kennedy Town	Pink	Full length	--
HK35	Pedder Street	--	Full length	--
HK36	Pok Fu Lam Road	Pink	Section between Shek Pai Wan Road and Hill Road Flyover	--
HK37	Queen's Road Central	--	Full length	Section between Garden Road and D'Aguilar Street
HK38	Queen's Road East	--	Full length	Section between Kennedy Road and Morrison Hill Road
HK39	Queensway	Red	Full length	--
HK40	Repulse Bay Road	--	Section between Wong Nai Chung Gap Road and Belview Drive	--
HK41	Rock Hill Street	Pink	Full length	--
HK42	Sands Street	Pink	Section between Shing Sai Street and Rock Hill Street	--
HK43	Shek Pai Wan Road	Pink	Full length	--
HK44	Shing Sai Road	--	Full length	--
HK45	Smithfield	Pink	Section between Rock Hill Street and Pok Fu Lam Road	--
HK46	Stubbs Road	--	Section between Shiu Fai Terrace and Tai Hang Road	Section between Queen's Road East and Shiu Fai Terrace
HK47	Tai Hang Road	--	Section between Stubbs Road and Blue Pool Road	--
HK48	Tin Hau Temple Road	--	Section between King's Road and New Eastern Terrace	--
HK49	Tin Lok Lane	--	--	Full length
HK50	Victoria Park Road	Red	Section between Gloucester Road and Island Eastern Corridor	Section between Gloucester Road and Island Eastern Corridor
HK51	Wing Tai Road	Pink	Full length	--
HK52	Wong Chuk Hang Road	Red & Pink	Section between Aberdeen Main Road and Aberdeen Tunnel Toll Gate	At-grade road alongside Wong Chuk Hang flyover
HK53	Wong Chuk Hang Road	Pink	Section between Shouson Hill Road and Aberdeen Tunnel Toll Plaza	

TIA and Day-time Ban Routes in Kowloon (September 2011)

Roads in Kowloon		Route	TIA	Day-time Ban
K1	Argyle Street	Pink	Full length	Argyle Street W/B – Section between Yim Po Fong Street and Ferry Street
K2	Austin Road	Pink	Full length	Full length
K3	Austin Road West	--	Full length	--
K4	Boundary Street	Pink	Full length	Section between Tai Hang Tung Road and Waterloo Road
K5	Canton Road	Pink	Section between Austin Road and Kowloon Park Drive	Section between Austin Road and Kowloon Park Drive
K6	Chatham Road North	Red	Full length	Chatham Road North W/B – Section between Wuhu Street and Chatham Road South
K7	Chatham Road South	Red & Pink	Full length	1. Section between Cameron Road and Flyover to Princess Margaret Road 2. Chatham Road South E/B – Section between Gascoigne Road and Slip Road to Hong Chong Road
K8	Cheong Wan Road	Pink	Full length	--
K9	Cherry Street W/B	Pink	Section between Tong Mi Road and Hoi Fai Road	--
K10	Cheung Sha Wan Road	--	--	Section between Kom Tsun Street and Tai Nan West Street
K11	Ching Cheung Road	Red	Full length	--
K12	Clear Water Bay Road (Kowloon Portion)	Pink	Section between Lung Cheung Road and Anderson Road	Section between Lung Cheung Road and the west end of New Clear Water Bay Road
K13	Cross Harbour Tunnel	Red	Full length	--
K14	East Kowloon Way	Red	Full length	--
K15	Ferry Street	Pink	Section between Cherry Street and Jordan Road	--
K16	Gascoigne Road E/B	--	--	Section between Wylie Road and Chatham Road South
K17	Gascoigne Road Flyover	Red	Full length	--
K18	Hoi Yuen Road	--	Section between Kwun Tong Road and Hing Yip Street	--
K19	Hok Yuen Street	--	Section between Ma Tau Wai Road and Man Lok Street	--
K20	Hong Chong Road	Red	Full length	1. Section between Cross Harbour Tunnel Toll Gate and Princess Margaret Road 2. Hong Chong Road N/B – Section between Hong Tai Path and Chatham Road South
K21	Hung Hom Road	--	Section between Tai Wan Road and Tak Man Street	--
K22	Jordan Road	Pink	Full length	--
K23	Kai Fuk Road	Pink	Full length	--
K24	Kai Tak Tunnel	Red	Full length	--
K25	Kowloon Park Drive	--	Full length	--

Roads in Kowloon		Route	TIA	Day-time Ban
K26	Kwai Chung Road – Lai Chi Kok Bridge	Red	Full length	--
K27	Kwun Tong Bypass	Red	Full length	--
K28	Kwun Tong Road	Red	Full length	Kwun Tong Road W/B – At-grade section between Hoi Yuen Road and Cha Kwo Ling Road
K29	Lai Chi Kok Road	Pink	Full length	1. Section between Butterfly Valley Road and Po Lun Street 2. Lai Chi Kok Road S/B – Section between Kom Tsun Street and Tai Nan West Street
K30	Lei Yue Mun Road	Red & Pink	Section between Kwun Tong Road and the west end of Ko Chiu Road (outside St Antonius Girls' College)	--
K31	Lion Rock Tunnel Road (Kowloon Portion)	Red	Full length	--
K32	Lung Cheung Road	Red	Full length	Lung Cheung Road W/B – Section between Fung Mo Street and Lion Rock Tunnel Road
K33	Ma Tau Chung Road	Pink	Full length	--
K34	Ma Tau Wai Road	Pink	Full length	--
K35	Nathan Road	Pink	Full length	Nathan Road S/B – Section between Boundary Street and Jordan Road
K36	New Clear Water Bay Road	Pink	Full length	--
K37	Nga Cheung Road	Pink	Full length	--
K38	Ngau Tau Kok Road	--	--	Section between Kwun Tong Road and Jordan Valley North Road
K39	Prince Edward Road East	Red	Full length	--
K40	Prince Edward Road West	Pink	Full length	Section between Sai Yueng Choi Street South and Portland Street
K41	Princess Margaret Road	Red	Full length	Princess Margaret Road S/B – Section between Wylie Road and Hong Chong Road
K42	Sai Yee Street	--	Section between Argyle Street and Prince Edward Road West	Sai Yee Street S/B – Section between Mong Kok Road and Argyle Street
K43	Salisbury Road	Pink	Full length	Section between Star Ferry Pier and Canton Road
K44	Tai Nan West Street	--	--	Section between Lai Chi Kok Road and Castle Peak Road
K45	Tai Po Road (Kowloon Portion)	--	--	Section between Ching Cheung Road and Caldecott Road
K46	Tak Man Street	--	Full length	--
K47	Tong Mi Road S/B & N/B	Red (S/B only)	Section between Arran Street and Argyle Street	--
K48	Tseung Kwan O Road	Red	Full length	--
K49	Wai Yip Street	--	Section between Hoi Yuen Road and Lai Yip Street	--
K50	Waterloo Road	Red & Pink	Full length	Section between Lion Rock Tunnel Road and Lancashire Road

Roads in Kowloon		Route	TIA	Day-time Ban
K51	West Kowloon Corridor	Pink	Full length	--
K52	West Kowloon Highway	Pink	Full length	--
K53	Wuhu Street	--	Full length	--
K54	Wylie Road	--	Section between Princess Margaret Road and Gascoigne Road	--
K55	Yen Chow Street	--	Section between Castle Peak Road and Cheung Sha Wan Road	--

TIA and Day-time Ban Routes in New Territories (September 2011)

Roads in New Territories		Route	TIA	Day-time Ban
NT1	Castle Peak Road (from Kwai Chung to Tai Lam)	Pink	Section between Butterfly Valley Road and Lok Yi Street	--
NT2	Castle Peak Road – Yuen Long	Pink	Full length	--
NT3	Cheung Pei Shan Road	Pink	Full length	--
NT4	Cheung Tsing Highway	Red	Full length	--
NT5	Cheung Tsing Tunnel	Red	Full length	--
NT6	Clear Water Bay Road	Pink	Section between Anderson Road and University Road	--
NT7	Container Port Road	--	--	Full length
NT8	Container Port Road South	Red	Full length	--
NT9	Fanling Highway	Red	Full length	--
NT10	Fantasy Road	Pink	Full length	--
NT11	Fo Tan Road	--	Full length	--
NT12	Hiram's Highway	Pink	Full length	--
NT13	Jockey Club Road	Pink	Full length	--
NT14	Kam Tin Road	--	Section between Au Tau and Kam Sheung Road	--
NT15	Kong Shum Western Highway	Red	Full length	--
NT16	Kwai Chung Road	Red & Pink	Full length	Section between Lai Chi Kok Bridge and Tsuen Wan Road
NT17	Kwai Tsing Road (Tsing Yi Bridge and Kwai Tsing Bridge included)	Pink	Section between Tsuen Wan Road and Tsing Yi Interchange	Section between Tsuen Wan Road and Tsing Yi Interchange
NT18	Kwong Fuk Road	--	Section between Nam Wan Road and Pak Shing Street	Section between Nam Wan Road and Po Heung Street
NT19	Lantau Link	Red	Full length	--
NT20	Lion Rock Tunnel	Red	--	Full length
NT21	Lion Rock Tunnel Road	Red		Full length
NT22	Ma On Shan Road	Pink	Full length	--
NT23	Ma On Shan Bypass	Pink	Full length	--
NT24	Magic Road	Pink	Section between Penny's Bay Highway and Fantasy Road	
NT25	Man Kam To Road	Pink	Full length	--
NT26	New Hiram's Highway	--	Full length	--
NT27	North Lantau Highway	Red	Full length	--
NT28	North West Tsing Yi Interchange	Red	Full length	--
NT29	Pak Wo Road	--	Full length	--
NT30	Penny's Bay Highway	Pink	Full length	--
NT31	Po Shek Wu Road	Pink	Full length	--
NT32	Po Tung Road	--	Section between Hiram's Highway and Tai Mong Tsai Road	--
NT33	Pok Oi Interchange	Red	Full length	--
NT34	Sai Sha Road	Pink	Section between Ma On Shan Road (near Hang Tak Street) and Tai Mong Tsai Road	--
NT35	San Sham Road	Red	Full length	--

Roads in New Territories		Route	TIA	Day-time Ban
NT36	San Tin Highway	Red	Full length	--
NT37	San Tin Interchange	Red	Full length	--
NT38	Sha Lek Highway	--	Full length	--
NT39	Sha Tau Kok Road	Pink	Full length	--
NT40	Sha Tin Centre Street	--	--	Full length
NT41	Sha Tin Road	Red	Full length	--
NT42	Sha Tin Rural Committee Road	--	Full length	--
NT43	Shap Pat Heung Interchange	Red	Full length	--
NT44	Shenzhen Bay Bridge	Red	Full length	--
NT45	Shing Mun Tunnel Road	Pink	Full length	--
NT46	Shing Mun Tunnel	Red	--	Full length
NT47	Tai Mong Tsai Road	--	Section between Po Tung Road and Sai Sha Road	--
NT48	Tai Po Road (from Piper's Hill to Tai Wai)	--	--	Section between Caldecott Road and Lion Rock Tunnel Road
NT49	Tai Po Road – Sha Tin	Red	--	Full length
NT50	Tai Po Road – Tai Wo	Pink	Full length	--
NT51	Tam Kon Shan Interchange	Pink	Full length	--
NT52	Tate's Cairn Highway	Red	Full length	--
NT53	Texaco Road (excluding section from Tsuen Tsing Interchange to Ma Tau Pa Road)	Pink	Full length	Section between Tsuen Tsing Interchange and Tai Wo Hau Road
NT54	Texaco Road North	Pink	Full length	--
NT55	Tolo Highway	Red	Full length	--
NT56	Tseung Kwan O Tunnel	Red	Full length	--
NT57	Tseung Kwan O Tunnel Road	Red	Full length	--
NT58	Tsing Kwai Highway	Red	Full length	--
NT59	Tsing Long Highway (Ting Kau Bridge included)	Red	Full length	--
NT60	Tsing Sha Highway	Red	Full length	--
NT61	Tsing Tsuen Road (Tsing Tsuen Bridge included)	Pink	Full length	Full length
NT62	Tsing Yi North Coastal Road	Pink	Full length	--
NT63	Tsuen Kam Interchange	Pink	Full length	--
NT64	Tsuen Tsing Interchange	Red	Full length	--
NT65	Tsuen Wan Road	Red	Full length	--
NT66	Tuen Mun Road	Red	Full length	--
NT67	Wan Po Road	--	Section between Po Shun Road and Wan O Road	--
NT68	Yuen Long Highway	Red	Full length	--
NT69	Yuen Wo Road	--	Full length	--

GUIDELINES AND REQUIREMENTS OF TRAFFIC IMPACT ASSESSMENT FOR ROAD OPENING WORKS

1. Requirements for Traffic Impact Assessment

1.1 Traffic Impact Assessments (TIA) are required for all road opening works in the sensitive areas which will affect the vehicle movements. Highways Department will maintain and issue from time to time plans showing the extent of the sensitive areas for such purpose.

1.2 Emergency works are normally exempted.

2. Objectives of Traffic Impact Assessment for Road Opening Works

2.1 The main objectives of TIA are

a) to assess the traffic implications of carrying road opening works in the sensitive areas;

b) to devise appropriate temporary traffic management measures to ameliorate the traffic impacts of the road opening works.

3. Contents of the Traffic Impact Assessment Report

3.1 The TIA report should contain at least the following information:

a) the name of the Agency which the road opening work belongs to;

b) a serial number of the work for reference;

c) data of submission;

d) the name of works agency, i.e. the contractor;

e) the name and telephone number of the contact person for the TIA;

f) description of the works including the proposed programme and phasing of the works;

g) existing street inventory within the Study Area

The Study Area should be large enough to include all significant impacts of the proposal. At a minimum, the area should include the adjacent traffic

signal controlled intersections or the area of influence that the proposed road opening works may have an impact on the existing road networks.

The existing street inventory with the Study Area should be recorded in detail. This usually includes street name, number of lanes and lane widths, direction of traffic flows, road markings and traffic aids, geometric and characteristics at critical intersections, existing site access points, right of way and pedestrian facilities.

h) existing traffic conditions

Traffic counts should be carried out to obtain traffic flow figures for the TIA. The count should be carried out at the critical peak period. The signal phasing and timing at signalised intersections and the public transport services affected should be included. Pedestrian count should also be required if existing pedestrian facilities are severed. A sample traffic *count* sheet is in Annex 1.

i) forecast traffic conditions (if necessary) -

The existing traffic conditions can be used for the traffic analysis for road opening works which will be completed within six *months* from the submission date of the TIA report. For road opening works beyond such period, the future traffic conditions should be estimated by using growth factor method based *on historic* volume information and existing counts. The Annual Traffic Census Reports published by Transport Department can be used for such purpose. The forecast future traffic conditions can then be applied to the different stages of the implementation of the temporary traffic management measures.

j) proposed traffic management measures for each stage;

Appropriate temporary traffic management schemes should be devised for the implementation of the road opening works. The various aspects in Annex 2 should be followed in proposing traffic management measures.

k) traffic analysis for each stage;

The traffic analysis should be carried out for the most critical peak period and for different stages of the road opening works. The following items need to be assessed:

- volume/capacity ratios (v/c ratios) of the roads
 - reserved capacities (R.C.) of the road junctions
 - design flow/capacity ratio (DFC) of priority junctions and roundabouts
- The calculation of the v/c ratios, reserve capacities and DFC should be carried out in accordance with the Transport Planning and Design Manual

(TPDM) Volumes 2 and 4. The traffic signal calculation sheet (Annex 3) should be used for the calculation of the v/c ratios of the road junctions.

l) consultation (optional)

The parties which have been consulted on the proposal should be included here. Examples are the client departments, the Police, the public transport operators, District Office etc. Consultation with the Traffic and Transport Committee of the concerned District Boards is normally not needed for minor, projects but maybe required at the request of Transport Department or the District Office.

m) recommendation.

Summery findings and recommendations of the TIA should be given. It should include a recommended traffic scheme and detailed plans showing the proposed road opening works and the traffic management measures for each stage of the works.

4. Procedures

4.1. One copy of the TIA report should be submitted to the regional office of Transport Department with copy sent to Commissioner of Police, and the Traffic Control and Surveillance Division of TD if the proposed work is within the Area Traffic Control areas.

4.2. Upon the receipt of the report, CE/TCS should forward their comments, if any, to the regional office of Transport Department within two weeks of the submission.

4.3 The regional office of Transport Department can reject the TIA or approve it with or without conditions. A copy of such notice will be sent to the applicants within reasonable period, say three weeks from the date of receiving the TIA report for simple cases. For complicated cases, Transport Department may need to liaise with the applicant or other parties and the process will take longer. Transport Department will notify the applicant if the process takes longer than six weeks.

Issues to be taken into account in preparing traffic management measures:

1. Lighting signing and guarding of Road Works

The Code of Practice for the Lighting; Signing & Guarding of Road Works should be followed.

2. Pedestrian arrangement

Adequate and safe pedestrian crossing facilities and temporary diversions should be provided.

3. Access arrangement

Existing ingress/egress and other vehicular rights of way which may be affected by the project may need to be maintained. Recommended temporary access designs may be required.

4. Parking

Extent of on street parking spaces or other off street parking facilities affected by the works should be identified and consideration should be given as to whether it is necessary to provide alternative parking spaces under the project to supplement the loss of existing provisions.

5. Public transport arrangements

Adequate public transport services should be maintained. Schemes of temporary routing and stops should be agreed with the concerned transport operators and the Transport Department in advance.

6. Servicing arrangement

Extent of existing loading/unloading provisions affected by the works should be identified and consideration should be given as to whether alternative provisions is required.

7. Special event arrangement

If there is any special event, such as Race Days, or concerts etc. Then the adequacy or otherwise the deficiencies of the road networks affected by the road opening works should be analysed and checked and taken into account.

8. Safety consideration

Due consideration should be given to the safety aspect of all the proposed temporary schemes and measures towards all road users and pedestrians.

Location :
 Time of day :
 Sheet No. :
 Date :

TRAFFIC SIGNAL CALCULATION SHEET
 DIAGRAM 2.4.10.1 (T.P.D.M. V. 4.2)

Division :	
Designed by:	
Checked by :	

Movement/Phase	(1) Width m	(2) Sat Flow pcu/h	(3) Site factors	(4) Rev Sat Flow pcu/h	(5) Flow pcu/h	(6) Rev Flow pcu/h	(7) $y = \frac{(6)}{(4)}$	(8) greater y	(9) $Y = \sum y$	(10) $L = x(I-1)$ sec	(16) for c sec	(19) $\frac{g}{Y} (c-L)$	(20) Leg. sat. $\frac{(6)}{(4)} \times \frac{(16)}{(19)}$

P.C.U. factor = STAGE/PHASE SEQUENCE DIAGRAM (with flows in p.c.u.)

(11) $c_0 = \frac{1.5L + 5}{1 - Y}$													
(12) $c_m = \frac{L}{1 - Y}$													
(13) $Y_{ult} = 0.9 - 0.0075L$													
(14) H.C. = $\frac{Y_{ult} - Y}{(ult) Y} \times 100\%$		I=	G=	I=	G=	I=	G=	I=	G=	I=	G=	I=	G=

(15) $c_p = \frac{0.9L}{0.9 - Y}$		SATURATION FLOW (p.c.u./h) : (i) When width W < 5.45m																												
(16) assigned c		<table border="1"> <tr> <td>WIDTH(W) METRES</td> <td>3.03</td> <td>3.33</td> <td>3.63</td> <td>3.94</td> <td>4.24</td> <td>4.54</td> <td>4.85</td> <td>5.15</td> </tr> <tr> <td>SATURATION FLOW P.c.u./h</td> <td>1850</td> <td>1875</td> <td>1900</td> <td>1950</td> <td>2075</td> <td>2250</td> <td>2475</td> <td>2700</td> </tr> </table>											WIDTH(W) METRES	3.03	3.33	3.63	3.94	4.24	4.54	4.85	5.15	SATURATION FLOW P.c.u./h	1850	1875	1900	1950	2075	2250	2475	2700
WIDTH(W) METRES	3.03	3.33	3.63	3.94	4.24	4.54	4.85	5.15																						
SATURATION FLOW P.c.u./h	1850	1875	1900	1950	2075	2250	2475	2700																						
(17) $Y_{max} = 1 - \frac{L}{c}$		(ii) When width W > 5.45m SAT FLOW = 525W or S_i , whichever the greater, (p.c.u./h) where $S_i = 1790$ p.c.u. or 1690 p.c.u. (kerb-side lane)																												
(18) R.C. = $\frac{0.9Y_{max} - Y}{(c) Y} \times 100\%$		(iii) SAT FLOWS (p.c.u./h) for exclusive turning lane(s) and no opposing flow $1 \text{ lane} = \frac{1800}{1 + \frac{1515}{r}}$ $2 \text{ lane} = \frac{3000}{1 + \frac{1515}{r}}$ where r = radius of turn <u>Turning vehicles (shared lane)</u> left turn : adjust 125% right turn : adjust 175% (assumes opposing flow)																												

Site Factors : adjust 3% for each 1% gradient
 adjust : 85% (poor) - 120% (good)

Pedestrian crossing minimum green & flashing green times checked Y N

2.4.10 Traffic Signal Calculation Sheet (Diagram 2.4.10.1)

2.4.10.1A Traffic Signal Calculation Sheet' has been devised for the convenience of performing signal computation. Most of the useful formula have been incorporated so that a designer may perform signal calculations without referring back to the Manual. The designer may also use his own discretion in using the worksheet in part only, or modifying it to suit his particular purpose.

2.4.10.2 Brief notes on the columns and rows:

Col 1 - width of approach or lane width applicable for movement

Col 2 - corresponding saturation flow

Col 3 - site factors for making adjustment to saturation flow

Col 4 - revised saturation flow after adjusting for site factors

Col 5 - design flow

Col 6 - revised design flow after adjusting for left turners/
turners/right turners

Col 7 - flow factors

Col 8 - greater y value

Col 9 - Summation of the greater y-value

Col 10 - cycle lost time

Row 11 - optimum cycle time

Row 12 - minimum cycle time

Row 13 - practical Y value for the ultimate situation i.e. 120 sec cycle time

Row 14 - reserve junction capacity for the ultimate situation i.e. 120 sec
cycle time

Row 15 - practical cycle time

Row/Col 16 - selected cycle time

Row 17 - maximum Y value for the selected cycle time

Row 18 - reserve capacity of junction operating at the selected cycle time

Row 19 - effective green time

Row 20 - degree of saturation for movement

2.4.10.3 Stage/Phase Sequence diagram

The method of signal control should be fully illustrated by the Stage/Phase Sequence diagram, complete with the following details:-

(i) Diagrammatic junction layout

(ii) Signals operation sequence

(iii) Design flows in p.c.u./hr.

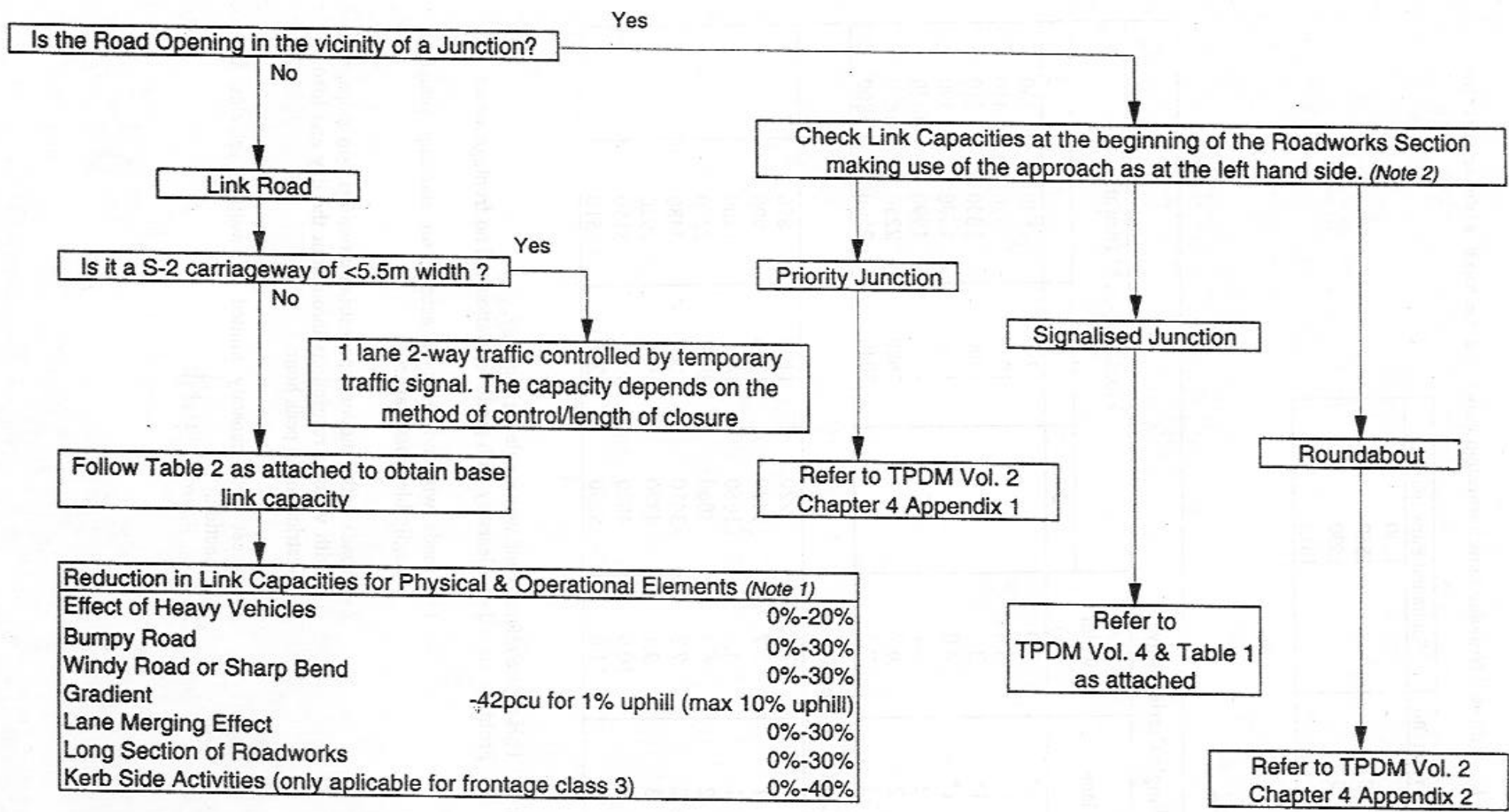
(iv) factor, if necessary, for converting unclassified counts from p.c.u./hr to
p.c.u./hr.

(v) Intergreen periods required

(vi) Actual green times ($G = g - 1$)

2.4.10.4 Traffic signal design calculation should be treated as a starting point only. In practice further improvements can often be made after installation by incremental adjustments following on-site observations.

Flowchart on Estimate of Road Capacities under Roadworks Conditions



Reduction in Link Capacities for Physical & Operational Elements (Note 1)	
Effect of Heavy Vehicles	0%-20%
Bumpy Road	0%-30%
Windy Road or Sharp Bend	0%-30%
Gradient	-42pcu for 1% uphill (max 10% uphill)
Lane Merging Effect	0%-30%
Long Section of Roadworks	0%-30%
Kerb Side Activities (only aplicable for frontage class 3)	0%-40%

Note:

- 1 The percentages suggested are ranges for general roadworks conditions. Discretion are required for individual cases. It is suggested that utility undertakers should agree with the Regional Traffic Engineering Division of TD on the assumption at the early stage of TIA
- 2 In case the roadworks is in the vicinity of a junction, both the link capacities and the junction performance should be checked.

Table 1 Adjusted Nearside Lane Saturation Flows due to kerb side activities

Lane Width (m)	Saturation Flow (pcu/hr)
3	1530
3.4	1560
3.7	1590
4	1612

Table 2

Single Carriageway					
lane	c/w width (m)	Frontage type ** (pcu/hr)			
		0	1	2	3
1*	3.0		790	640	330
1*	3.4		1030	820	410
1*	3.7		1300	1030	510
1*	4.0		1340	1090	590
2	6.1		2530	1990	1420
2	6.7		2680	2250	1620
2	7.3		3040	2500	1800
Dual Carriageway					
1	3.4	1220	1100	890	
1	3.7	1430	1210	990	
1	4.6	1660	1430	1200	
2	6.7	3060	2800	2270	
2	7.3	3410	3040	2480	
3	9.1	4370	3550	2920	
3	10.0	4820	3980	3150	
3	11.0	5250	4290	3510	

Notes: * This figure refers to one way single carriageway.

** Frontage class 0 = clearway with grade separation and no frontage access

1 = roads with no frontage access, no standing vehicles, negligible cross-traffic.

2 = roads with junctions, pedestrian crossings, bus stops, but with waiting restrictions throughout the day and loading restrictions in peak hour.

3 = street with capacity limited by waiting vehicles and junction.

NOISE MANAGEMENT GROUP

PRACTICE NOTE FOR LOCAL CONTROL OFFICES

Noise from Essential Construction Works

1. In considering construction noise permit applications for essential works, Section 3.2 of the TM# specifies that "the Authority shall ensure that the quietest practicable working methods are being employed".

2. Demolition and road breaking works using conventional pneumatic tools are particularly intrusive and disturbing. Some construction techniques and equipment are available in limited supply in the local market for quieter demolition and road breaking works.

3. A programme is being developed requiring the ultimate mandatory adoption by contractors of these equipment and techniques. Full implementation of this scheme requires extensive liaison work with the relevant bodies and suppliers.

4. In the interim, proven quiet construction equipment and methods as indicated in Annex A should be adopted as far as practicable. Other commonly used effective noise control measures applicable for site construction that should also be adopted whenever practicable are given in Annex B.

5. As a general rule, the use of breakers should only be limited to before 11 p.m. unless site constraint (e.g. road closure only allowed late at night by Police) dictates otherwise, in which case acoustic enclosures shall be used unless it is not practicable when acoustic baffles must then be adopted. Prior inspection/noise measurement to ascertain the effectiveness of the acoustic enclosure shall be conducted before a construction noise permit is issued.

'TM' stands for Technical Memorandum on Noise from Construction Work other than Percussive Piling.

TYPES OF PRACTICABLE QUIET CONSTRUCTION EQUIPMENT AND TECHNIQUES AVAILABLE FOR ROADWORKS

1. Concrete Demolition

- * Crushers
- * Smashes
- * Cutters

2. Road Demolition/Reconstruction

- * Pavement Rippers
- * Saw-and-Lift Method

3. Rock Breaking

- * Non-Explosive Chemical Agent
- * Hydraulic Splitters

4. Underground Services

- * Pipe Jacking
- * In-Situ Pipe Repairing Method

EFFECTIVENESS AND EFFICIENCY OF QUIET CONSTRUCTION EQUIPMENT AND TECHNIQUES FOR ROADWORKS

1. Concrete Demolition

The use of conventional and noisy hydraulic or pneumatic breakers to demolish old power stations, telephone exchanges, buildings, foundations etc. in redevelopment projects is common in Hong Kong. These environmentally unfriendly practices should be discouraged.

Concrete crushers are now available for quick demolition of structures by bending and snapping. Far less noise is produced and field measurements have indicated that the sound power level is about 18 dB(A) lower than that of a hydraulic breaker. This efficient and quiet crusher method demonstrated successfully in the improvement work of major roads.

2. Road Demolition/Reconstruction

Reconstruction of roads, renewal of roadbeds and laying utility supplies may be required to be done at night and/or on holiday to avoid disruption to daytime road traffic on normal weekdays. Noise from breaking up the road surface is particularly intrusive and disturbing to nearby residents.

The use of pavement rippers which could strip and smash roadbeds is an alternative offering at least 10 dB(A) noise reduction when compared with breakers. Rippers cut quickly into roadbed, relying on kick force instead of percussive force of the breaker.

The saw-and-lift method also eliminates the use of breakers by using large-diameter circular saw to cut the concrete slab of a traffic lane into manageable rectangular sections which are then to be lifted and removed by a crane lorry. By sawing the concrete slab up quickly, it is an efficient technique to form a trench without causing prolonged breaking noise.

3. Rock Breaking

Instead of fracturing boulders and rocks by conventional hydraulic or pneumatic breakers in the course of trench formation, a non-explosive chemical agent could be applied for the same purpose. When the chemical agent in solution form is poured into holes drilled in rocks to be demolished, it expands and causes cracks systematically. The debris remained could be easily removed by a grab lorry.

Another method is to use hydraulic splitter which is made to expand mechanically inside drill holes.

4. Underground Services

Traditionally, the open-cut method is used in trench formation by breaking up the road surface for subsequent laying of utility supplies. It gives rise to severe noise disturbance and traffic disruption, especially in urban areas. Nowadays, various trenchless technologies have developed as quieter alternatives.

Pipe jacking is a type of micro-tunneling technique for putting concrete pipes under railways tracks, highways and rivers without any open-cutting. For replacing damaged underground pipes, the in-situ pipe repairing method can be used to form a new structural pipe within the original pipe and avoid opening up the busy road. All these methods help reduce noise and the social costs due to disruption to the road surface transport.

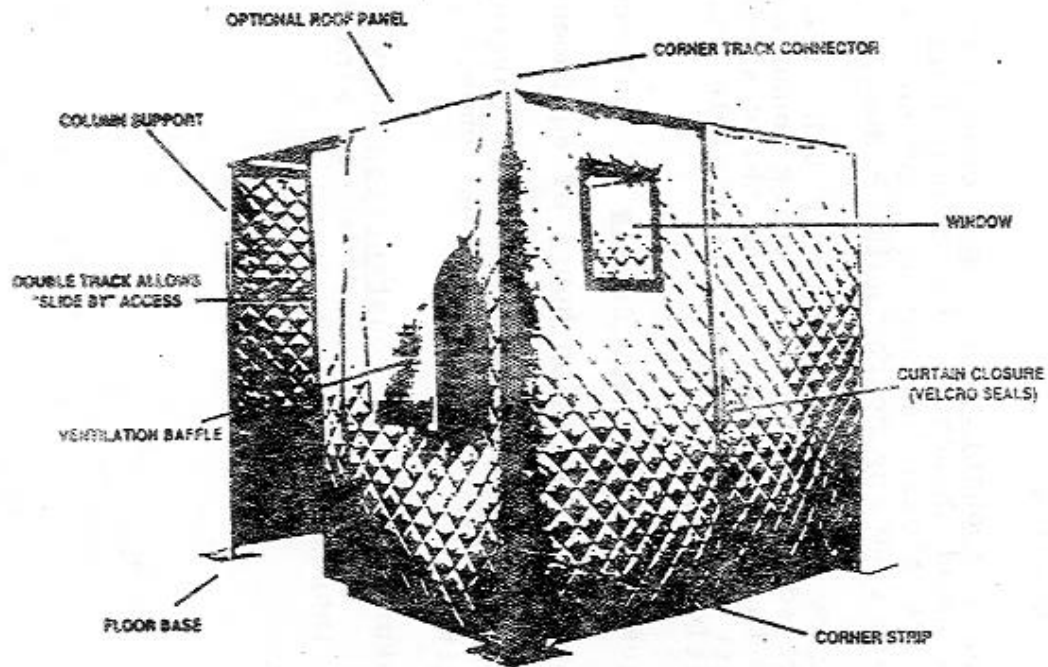
Given the availability of new, quieter and more efficient technologies, the construction industry now has a wider choice of proven quieter methods. It is necessary that project management shall put these quieter options as part of the requirements of the construction work for minimizing the potential noise impacts on noise-sensitive receivers such as domestic premises, schools etc. Contractors shall also implement appropriate noise mitigation measures as required for the betterment of the community and to comply with the Noise Control Ordinance during the restricted hours.

3-95a(n)

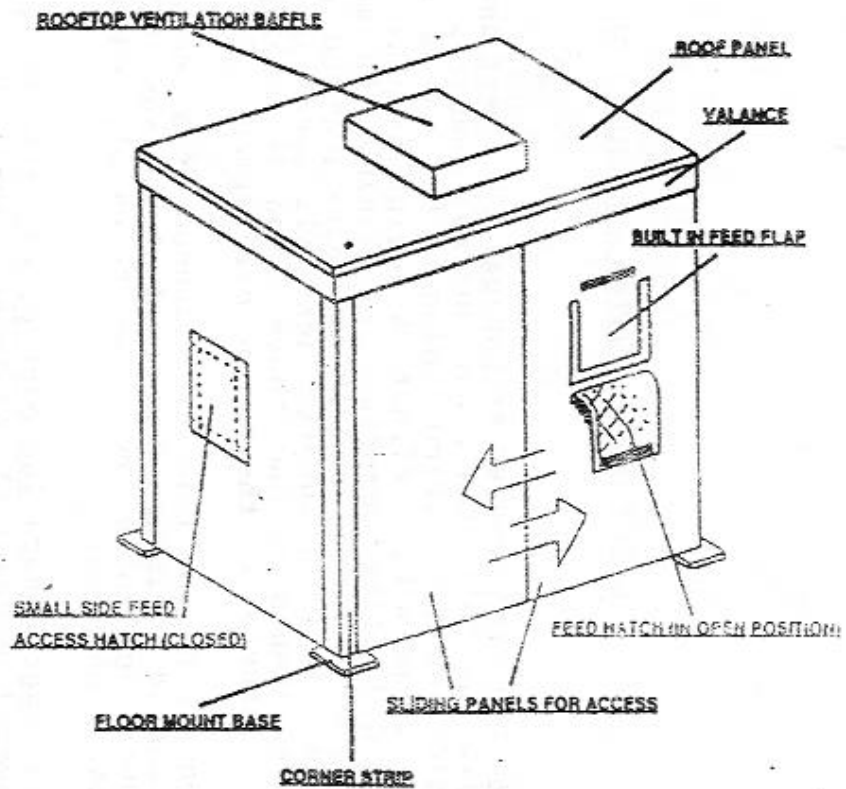
PRACTICABLE NOISE CONTROL MEASURES ON SITE

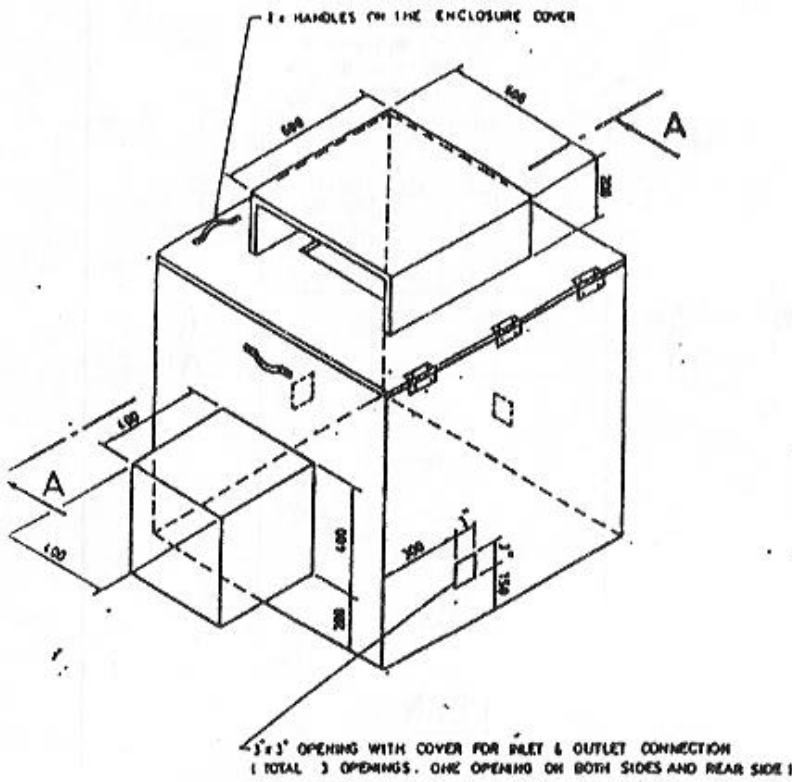
1. Vehicle-type powered mechanical equipment shall be equipped with the following noise control measures: minimum 50 mm thick sound absorbing lining to the engine compartments as far as possible, effective engine exhaust silencers. and sound baffles comprises of minimum 50 mm thick sound absorbing lining and 10 mm thick plywood (or 1 mm thick steel) backing mounted near all openings of the engine compartments 50 that there is no direct line of sight to the interior of the engine compartments.
2. Generators shall be of silenced type and enclosed by an acoustic enclosure comprised of minimum 50 mm thick sound absorbing lining and 10 mm thick plywood (or 1 mm thick steel) housing.
3. The power generating part of all diesel- or petrol-driven powered mechanical equipment shall be covered by an acoustic shed comprised of minimum 50 mm thick sound absorbing lining and 10 mm thick plywood (or 1 mm thick steel) housing.
4. To apply acoustic enclosure comprised of minimum 40 mm thick sound absorbing lining and 10 mm thick plywood (or 1 mm thick steel) backing so that no part of equipment \$s visible from any nearby noise - sensitive receiver.
5. To place operating equipment behind an acoustic baffle comprised of minimum 50 mm thick sound absorbing lining and 10 mm thick plywood (or 1 mm thick steel) backing so that no part of such equipment is visible from any nearby noise sensitive receive.
6. To close all flaps and panels equipment.
7. To limit the operating hours of equipment.
8. To reduce noise emission through careful scheduling, and re-scheduling through experience, of construction activities.
9. To ensure that the construction work is carried out as quickly as possible in order to minimise any potential noise intrusion.

ABSORBER & BARRIER CURTAIN SYSTEMS

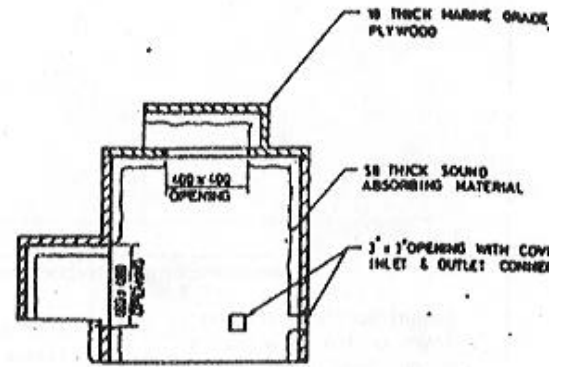


ACOUSTICAL CURTAIN ENCLOSURE



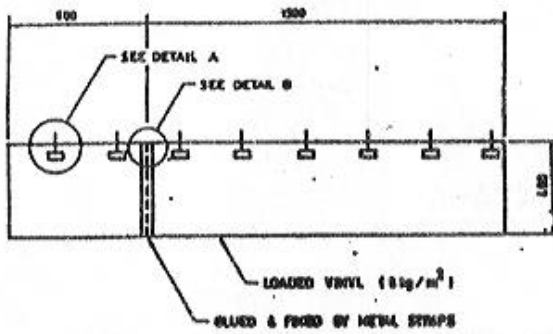


ISOMETRIC VIEW OF ACOUSTIC ENCLOSURE

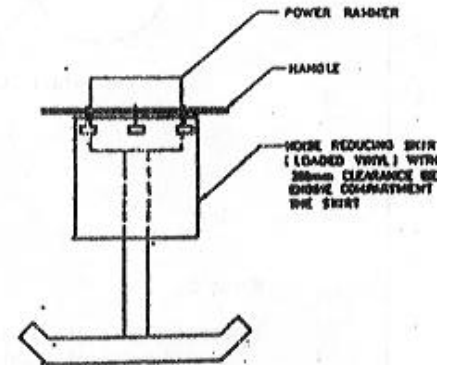


SECTIONAL VIEW ON A-A

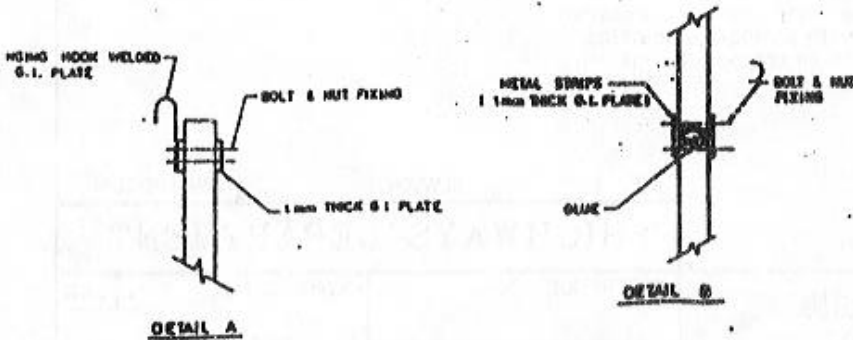
ACOUSTIC ENCLOSURE FOR REDUCING NOISE FROM WATER PUMP AND GENERATOR



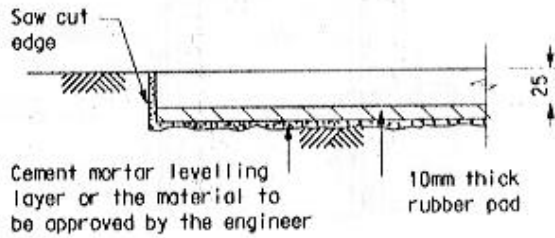
ELEVATION OF BARRIER SKIRTING



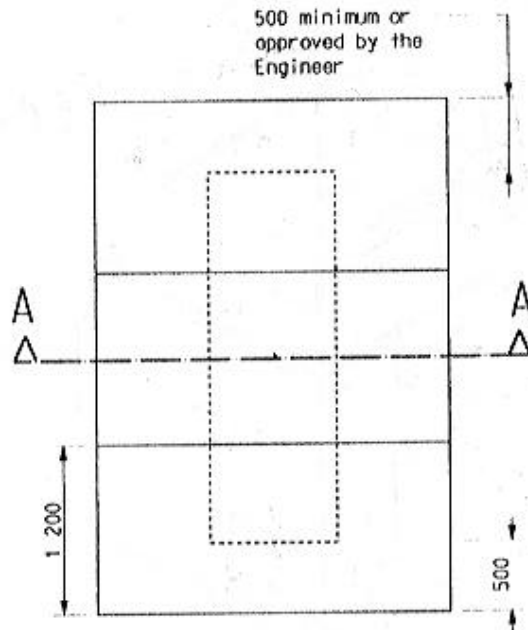
NOISE REDUCING SKIRT AND POWER RAMMER CHP USE ASSEMBLY



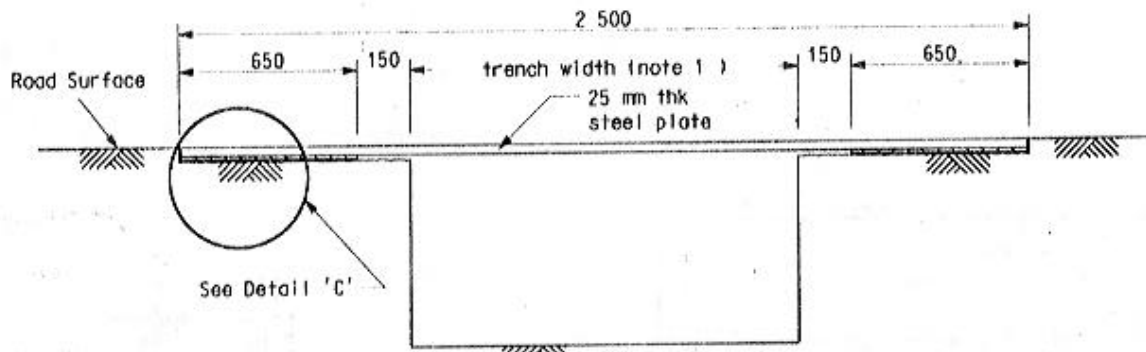
HANGER FIXING TYPE NOISE REDUCING SKIRT FOR POWER RAMMER



DETAIL 'C'
SCALE 1 : 5



PLAN



SECTION A-A

Notes :

1. For trench width of 900mm or more, steel channel details at underside of steel plate as shown in drawing no. RD/050' shall be adopted.
2. Structural steelwork shall be of grade 43C complied with BS4360 or equivalent.
3. Top of steelplate to be treated with anti-skid dressing; other surfaces to be treated with protective painting.
4. Details of lifting holes are to be approved by the Engineer.

REF.	REVISION	SIGNATURE	DATE
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HIGHWAYS DEPARTMENT

**TYPICAL VEHICLE CROSSING
OVER TRENCH OPENING
(FLUSH WITH ROAD SURFACE)**

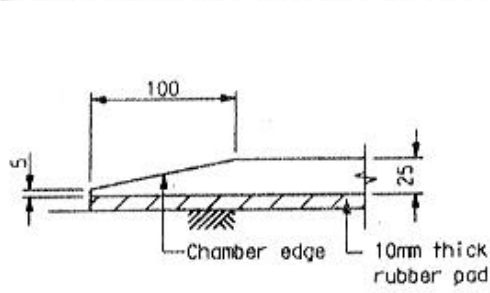
REFERENCE

DRAWING No.

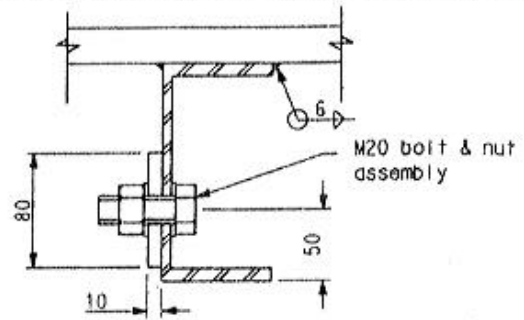
CAD

SCALE 1 : 20 OR AS SHOWN

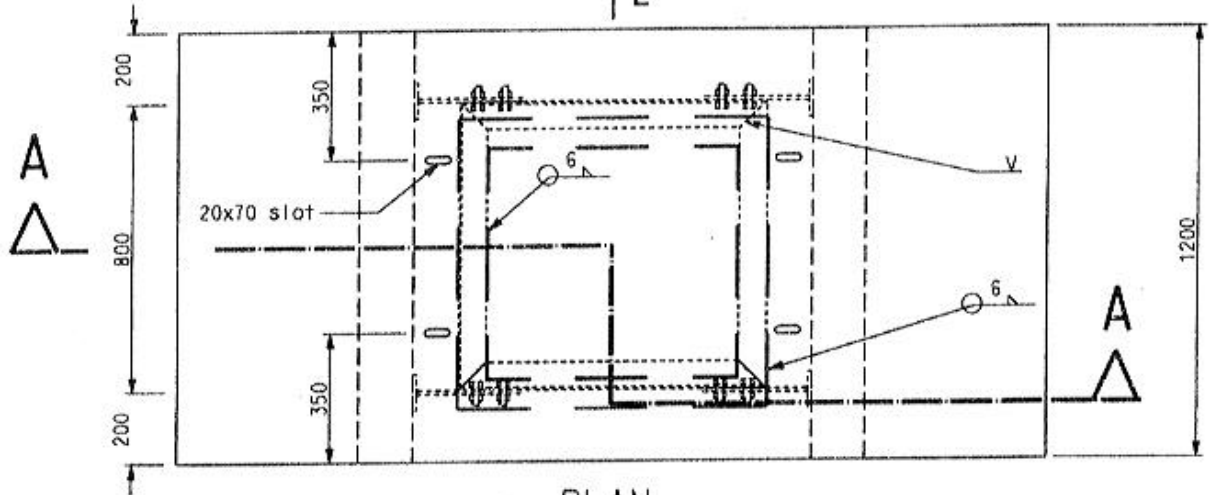
RD070



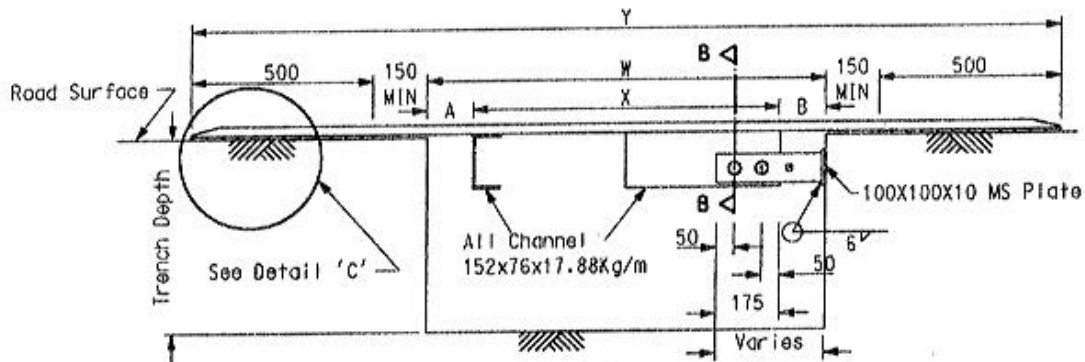
DETAIL 'C'
SCALE 1 : 5



SECTION B-B
SCALE 1 : 5



PLAN



SECTION A-A

Notes :

1. Structural steelwork shall be of grade 43C complied with BS4360 or equivalent.
2. All fillet welds to be 6mm unless otherwise specified.
3. Top of steelplate to be treated with anti-skid dressing; other surfaces to be treated with protective painting.
4. Welding between channels to be full penetration weld.
5. Design to be according to BS5400.
6. Other details of lifting holes are to be approved by the Engineer.

Type	W (Trench Width)	X	Y	A or B max
A	500 TO < 900	450	2200	225
B	900 TO < 1200	850	2500	175
C	1200 TO < 1400	1150	2700	125

A	Redrawn		
REF.	REVISION	SIGNATURE	DATE

HIGHWAYS DEPARTMENT

**TYPICAL VEHICLE CROSSING
OVER TRENCH OPENING**

REFERENCE

DRAWING No.

CAD

SCALE 1 : 20 OR
AS SHOWN

RD/050^A