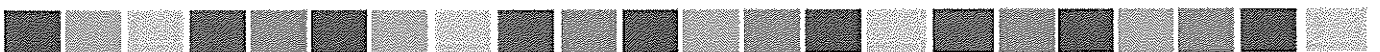


POLICY NO: WSC052

POLICY FOR BUILDING OVER OR ADJACENT TO SEWER MAINS

© Wyong Shire Council
Wyong Shire Council
2 Hely Street Wyong
PO Box 20 Wyong NSW 2259
P 02 4350 5555 F 02 4351 2098
E wsc@wyong.nsw.gov.au
W www.wyong.nsw.gov.au





AUTHORITY	NAME & TITLE	SIGNATURE	DATE
AUTHOR	Luke Drury, Team Leader, WS Planning		22/8/13
MANAGER	Greg Cashin, Acting Manager Water and Sewer		22/8/13
DIRECTOR	Greg McDonald, Director Infrastructure & Operations		22/8/13
GENERAL MANAGER	Michael Whittaker		28/8
MAYOR (IF APPLICABLE)			

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1	12/11/08	D01445938
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A. POLICY SUMMARY

A.1. This policy is designed to outline Wyong Council's requirements for working in proximity to sewer mains.

B. POLICY BACKGROUND

B.1. The policy objectives are as follows:

- To protect WSC's sewer mains from loads imposed by other structures.
- To allow access to those sewer mains by various means for repairs, upgrade or inspection in particular recognising technological innovation in trenchless technology to achieve such access and objectives.
- To ensure the stability and protection of structures over or near the sewer mains.
- To not unreasonably impede or restrict development.

C. DEFINITIONS

C1 **Council** means the elected representatives, Councillors, who form the governing body of Wyong Shire Council.

C2 **WSC** means Wyong Shire Council, being the organisation responsible for the administration of Council affairs and operations and the implementation of Council policy and strategies.

C3 **Applicant** means the party who is proposing to undertake development activities that involve working in proximity to sewer mains. This includes private developers, all internal Units of WSC and other utilities.

D. POLICY STATEMENTS

D1 This Policy covers all works in proximity to sewer mains whether they are undertaken by private developers, other Business Units of WSC or other utilities.

D2 It is the personal responsibility of all WSC employees and agents thereof to have knowledge of, and to ensure compliance with this policy.

D3 Applicant responsibilities:

- The applicant must confirm the exact location of sewer mains, including engagement of a land surveyor if location and / or depth are of a critical nature.
- The applicant shall provide full design details of any proposals that address the requirements of this policy to WSC for assessment and acceptance.

E. POLICY IMPLEMENTATION - PROCEDURES

E1 WSC building in proximity to sewer strategy

WSC's strategy for managing proposals that involve building in proximity to sewers is outlined below and described further in the following sections. It is the Applicant's responsibility to investigate and document the below options, in consultation with WSC.

1. Relocate proposed structure
2. Relocate WSC's affected sewer assets
3. Provide protection measures for both WSC sewer assets and proposed structure, and build over/adjacent to asset.

The Applicant shall consider an integrated approach and demonstrate that all associated risks can be managed with marginal costs if building over or adjacent to a sewer is to be considered and accepted by WSC.

E2 Relocation of proposed building

In all instances the first option considered should be the relocation of the proposed building away from the existing sewer assets.

If this is not feasible due the position of the sewer main on the property adversely restricting the use of the land, relocation of the sewer main may be considered.

E3 Relocation of assets

WSC will only consider relocation of existing sewer assets if the applicant can demonstrate that building away from the sewer adversely restricts the use of the land. Any relocation works need to ensure all required design standards (cover, grade, position) are still met and that the capacity/functionality of the assets are not reduced. All costs associated with the relocation of assets are to be funded by the Applicant.

E4 Relocation - Gravity mains

Where approval to relocate a sewer is granted, the Applicant will be required to submit design drawings prepared in accordance with WSC's adopted Code of Practice for the design and construction of gravity sewers. Relocating the sewer following design approval is required before construction of the proposed building/structure can commence. The applicant will need to liaise with WSC regarding the bypassing of live sewage flows.

E5 Relocation - Rising mains

Where approval to relocate a rising main is granted, the Applicant will be required to submit plans in accordance with WSC adopted code of practice for the design and construction of pressure mains. Following approval the applicant is required to relocate and ensure proper function of the rising main before construction of the building/structure can commence. The applicant will need to liaise with WSC regarding the bypassing of live sewage flows.

E6 Relocation - Easements

The Applicant may be required to acquire/provide an easement in accordance with WSC requirements over a relocated gravity and/or rising main.

E7 Building over sewer

WSC will only consider a building/structure over the sewer main in exceptional circumstances and then only if the applicant can demonstrate that relocating the building/structure and/or relocation of the sewer is not feasible.

E8 *CCTV inspection*

Where a proposal to build over a sewer is conditionally accepted by Council the following will be required;

- A CCTV inspection of the subject sewer, undertaken by a contractor qualified and with the necessary experience to do so, or by WSC at the applicant's expense.
- The results of the CCTV inspection are to be submitted to WSC prior to the preparation of any design required to comply with this policy. The CCTV inspection may also be used as a dilapidation survey, as the basis to determine any repair work required to rectify damage to the sewer caused by the development.

E9 *Results of the CCTV inspection*

Depending on the results of the CCTV inspection WSC may require the Applicant to:

- Reconstruct the sewer main in its existing location using construction materials as specified by WSC and in accordance with requirements set down within WSC adopted code of practice for the design and construction for Development Works and approved plans or;
- Reline the existing sewer main by the engagement of contractors qualified to undertake such work.

The name of contractor and the relining technique to be utilised will be submitted to WSC for approval prior to work commencing.

E10 *Existing Asbestos Cement (AC) and Vitreous Clay (VC) pipes*

WSC will not allow construction within the zone of influence (see section E17) of existing Asbestos Cement (AC) and Vitreous Clay (VC) pipes without their replacement/relining with a PVC or equivalent pipe material and the installation of relevant protection measures (see section E14).

WSC may consider entering a cost sharing agreement where it is beneficial to WSC to re-line a complete manhole to manhole length rather than the applicant just replacing a short section of pipe. This will be considered on a case by case basis where it is cost effective to WSC.

This requirement is due to these pipe materials having a higher chance of disruptive failure modes eg collapse of AC pipe.

E11 *Where the policy applies*

This working in proximity of sewers policy applies to the following four structure types.

1. Heavy or Permanent Structures
2. Light Weight or Semi-Permanent Structures
3. Miscellaneous Structures (Rainwater Tanks, Driveways etc.)
4. High rise developments

This policy applies to any development, such as the above which is built in the vicinity of WSC sewerage assets.

E12 Structures

Category 1 - Heavy or permanent structures

These structures are typically constructed from masonry, brick, steel, timber and concrete and it is neither reasonable nor practical to remove or dismantle the structure for the purpose of carrying out sewer repairs or refurbishment.

Examples of structures in this category include:

- Houses
- Factories
- Warehouses
- Brick Garages / Workshops
- Structures that are permanently habitable or used as a work place.
- In-Ground Swimming Pools

If category 1 structures are to be built in the vicinity of sewers, the requirements for protection of and access to the existing sewerage network in the following sections must be followed.

Category 2 - Lightweight or semi-permanent structures

These structures are typically of a type of construction that would make it reasonable to remove / dismantle and re-erect if access to the main, by excavation, was required.

Examples of structures in this category include:

- Pergolas
- Garden sheds
- Above ground pools (restrictions apply)
- Carports
- Timber / fibro / aluminium garages
- Glass houses / ferneries
- Barbecue facilities

These structures must be readily removable in the case of work required to take place on WSC sewerage assets. Asset protection measures as outlined in section E14, may still apply to certain structures within this category.

Any future costs arising from the requirement to remove and subsequently reassemble these structures, as directed by WSC, will be at the full cost of the owner.

Category 3 – Miscellaneous

Structures in this category do not normally require protection of the sewer mains. This category includes:

- Fences
- Driveways (concrete, asphalt, pavers etc)
- Tarmac areas

As long as minimum depth requirements for sewer main have been met, no special protection measures for the sewer main should be required. However, if uncertainty exists in cases of anticipated high loadings or where sewer mains are less than minimum depth advice shall be sought from WSC.

Any special conditions applied to Category 3 structures would be on a case-by-case basis and would include in part a stipulation that any removal and reinstatement of the structures (involved with WSC accessing the sewer main) would be at the cost of the owner.

Provisions required for access to the existing sewerage network still apply.

Note that Swimming Pools are discussed in Section E21 and Retaining Walls are discussed in Section E22.

Category 4 – High rise development

The impact of redevelopment with typically high rise buildings with basement car parks on WSC's sewerage infrastructure presents numerous design, construction and operational issues in the protection of WSC interests.

Section E13 identifies the issues and how they are to be addressed through the assessment, design, construction and operational phases to ensure WSC's interests are satisfied.

E13 *Construction not permitted*

Structures will not be permitted to be built over and/or in close proximity to the following:

- a. Sewer rising mains, surcharge mains and critical gravity mains (generally all sewer mains of greater diameter than 300mm mains and/or deemed to be excessively deep ie. greater than 3.0m), as determined by WSC.
- b. Any gravity sewer that, in the opinion of the WSC, is in a poor condition. Exposing of the sewer, and/or CCTV may be required prior to construction. This inspection may determine that repair/replacement may be required. Any subsequent repair/replacement work will be at the Applicant's cost.
- c. Sewer manholes, lampholes, maintenance points and junctions where sufficient clearances cannot be achieved. (see Section E18)
- d. No building within WSC easements.

E14 *Asset protection measures*

Where construction of any Category 1 or 2 structures will impose a load within an existing sewer assets zone of influence (see section E17), WSC may request the Applicant to carry out any combination of the following protection measures:

- Piering of foundations
- Concrete encasement

The protection measures may also be required due to other factors affecting the asset such as available cover.

E15 *Piering of foundations*

Piering of the proposed structures foundations may be requested to transfer loads outside an assets zone of influence. A certified design prepared by a suitably qualified and experienced Engineer will be required to accompany foundation designs. The plan shall show the design of

all footings, beams and piers and clearly note required clearances, ground levels and nominated soil classifications,

The following requirements apply to foundation piling:

- a. The building and its foundations are to be designed in such a way that no building loads are transmitted to the WSC sewer main and where possible, the pipe can be repaired or replaced at any time without affecting the stability of the building.
- b. Foundations within an assets zone of influence will require piling to a minimum depth of 150mm below the zone of influence of the affected asset or until solid rock is encountered.
- c. A minimum horizontal clearance of 1 metre is required between any piers and the face of a sewer main.

The use of displacement and screw pile construction methods will require approval by WSC and may require additional clearances to existing assets as directed.

E16 Concrete encasement

Concrete encasement of the sewer main may be requested for the protection of sewer mains due to additional loads imposed by the works. Concrete encasement may also be requested if WSC minimum cover requirements cannot be met.

Concrete encasement will generally not be permitted where the encased pipe will be located below or within 1m of a Category 1 structure. Encasement may, however, be suitable where minimum cover requirements cannot be met, and/or where the encased pipe is not within 1m of any Category 1 structure.

Any concrete encasement is to comply with the WSAA Standard Drawing (SEW 1205) and the following specification:

- a. Only rubber ring jointed vitrified clay and PVC pipes may be encased in concrete. Permission may also be given to replace other types of pipes with PVC pipes prior to encasement depending upon the location and criticality of the lines.
- b. In trenches of material other than rock, encasing is to extend 150mm under, on both sides and on top of the pipe barrel. For trenches in rock, encasing is to extend 100mm under the pipe barrel, 150mm on top of the pipe barrel and for the full width of the excavated trench.
- c. Unless otherwise specified, all flexible pipe joints are to be maintained. The minimum length of the encasement will be the total length of the sewer that is affected plus a minimum of 1000mm on the each side plus any additional length to ensure encasement starts and finishes at a flexible joint. (Subject to soil conditions and depth of sewer this length may increase)
- d. If a manhole is less than 2 metres from the end of encasement, as required above, the encasement is to be extended up to the second flexible joint from that manhole (typically 600mm from manhole).
- e. Backfilling of the trench with suitable material as per specification must not commence until at least 48 hours after placing the concrete.

- f. Concrete encasement shall not be poured integral with any other foundation or structure. Concrete should be minimum class N20 or N25 where a reinforced concrete design is required.
- g. Sewer junctions that are permitted to be incorporated in proposed concrete encasement are to be upgraded to a rubber ring jointed junction in order to maintain flexibility at the junction branch.
- h. Where the encasing of sewers in adjoining properties is required, written approval from the adjoining owner to enter the property to carry out the works will be required prior to approval being granted for works to commence.

WSC works inspectors must be present when encasement work is being carried out.

E17 Zone of influence

The Zone of Influence is an area extending both horizontally and longitudinally along the alignment of an underground asset. This area is considered as that part of the ground where:

1. Settlement or disturbance of the ground surrounding the pipe may cause damage to buildings or structures on the surface above.
2. Loads from buildings or structures on the surface may have an impact on the buried pipe.

The zone of influence shall be determined by extending a line at an angle of 2 (Horizontal): 1 (Vertical) to the surface, starting from a point 150mm below the invert of the sewer main and half of the trench width measured horizontally from the pipes centreline (See figure below)

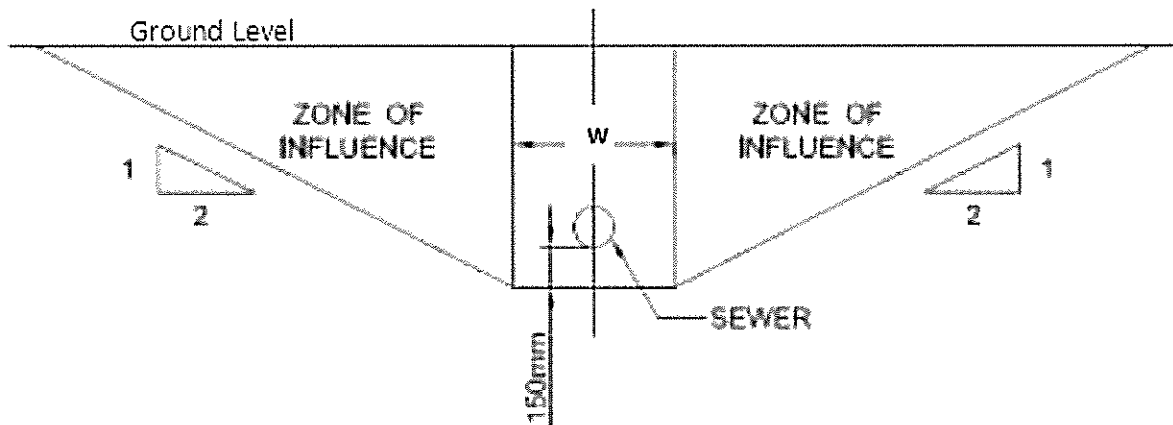


Figure 1 Zone of Influence

Pipe Diameter	Trench Width (w) for ZOI Calculation
≤300mm	900mm
>300mm - ≤450mm	Diameter + 700mm
> 450mm - ≤900mm	Diameter + 900mm

Note: The above trench width has made allowance for possible trench support requirements.

It is WSC discretion whether to consider a steeper angle of repose (max 1H:1V) for stiff soils (clays etc). Geotechnical investigations and a report from a suitably qualified and experienced Geotechnical Engineer need to be provided by the applicant to support such requests.

E18 *Clearances from access structures*

Any proposed structure shall not prevent future access to existing maintenance structures associated with sewerage assets. These include manholes, lampholes/maintenance shafts and sewer dead ends.

A minimum horizontal clearance of 1.5m is required around existing access structures as well as a minimum vertical clearance of 3m. The horizontal setback shall increase to 2m if two or more sides of an access structure are built around. The fourth side must be open and accessible at all times.

E19 *Access requirements*

WSC requires that all sewer access structures be accessible at all times in case of maintenance or emergency situations.

Developments on properties with sewer manholes or lampholes must provide at least 0.9 metre wide clear access to the sewer structures, ie along the boundary between fence and building. This is necessary to allow WSC staff access with their "tools of trade" such as cleaning rods and lid lifting equipment.

Developments which locate sewer manholes or lampholes in security areas must make suitable arrangements for access by WSC sewer operations staff for maintenance or emergency work.

E20 *Existing encumbrances*

Where structures have been built over sewerage assets without WSC approval then WSC may require that the structure be demolished, moved or substantially modified so that it complies with this policy.

Where it is necessary to access an underground sewer main for maintenance or repair work, WSC will not be held liable for the cost of restoring any illegal structures and the property owner may be charged for extra work required due to the illegal structure.

Where a structure has been given permission, previously by WSC, to be built over a sewer main then no further extensions, additions or reconstructions will be allowed without further assessment. WSC recognises that the existing structure presents a risk to both the building and WSC's liability. Therefore WSC will assess each structure on its own merit to give permission for additions.

E21 *Swimming pools:*

Above ground swimming pool

Above ground pools without floor decking around the pool, and not constructed of concrete or fibreglass, are considered to be semipermanent structures that are able to be removed on request to enable access to the sewer.

Special sewer protection provisions are not required for these pools provided that they are placed on the existing natural ground levels and minimum cover requirements to the sewer are met. Clearances to sewer access structures described above still apply. The owner should

be advised that all costs associated with removal and reinstatement of the pool for access to the sewer main will be at the owner's cost.

Above ground pools with permanent decking are considered to be permanent structures and are subject to the conditions outlined in Section E12.

In- ground swimming pools:

In ground Fibreglass pool

The following requirements apply to fibreglass pools:

- Minimum horizontal clearance from the pool to the face of sewer pipe of 1.5m
- Fibreglass pools are unable to be supported on piers due to the risk of cracking the fibreglass. WSC will review the proposal and determine if concrete encasement of the main is to occur or whether a PVC/GRP main without additional protection measures is acceptable within the zone of influence.
- No pool shall be located closer than 1.5 metres to any sewer maintenance structure (manholes etc).

In ground Concrete pool

The following requirements apply to concrete pools:

- Minimum horizontal clearance from the pool to the face of sewer pipe of 1m.
- If the concrete pool is within the zone of influence of a sewer main, then the foundations of the pool shall be founded below the zone of influence (eg. piers) to ensure the pool is self-supporting.
- No pool shall be located closer than 1.5 metres to a sewer maintenance structure (manholes etc).

E22 *Retaining walls*

The construction of retaining walls is subject to the following requirements:

- Where the footings of a wall would encroach on the zone of influence the wall is to be designed in accordance with Section E17.
- Generally walls over 1.0m in height would not be permitted within 1.0m of the main.
- Minimum cover over the main is to be maintained or an Engineer's assessment is required for protection of the main.
- The wall is to be set back at a minimum of 1.5 m from the centre of a sewer maintenance structures.
- A retaining wall less than 1.0m in height will be permitted over or within the zone of influence without the requirement for an Engineer's design provided that:
 - the wall is at least 3.0m from an adjoining property or building/structure;
 - The wall would not be subject to vehicle loadings.
- Any retaining wall crossing a sewer main must be supported over the main with a reinforced concrete foundation designed in accordance with Section E17 and E18 to ensure no loads from the wall are transferred to the sewer main ie. bridging slab foundation.

E23 *Filling over sewer mains*

The allowable depth of fill that can be placed over sewerage mains depends on the material type and stiffness class of the existing pipe. Site filling that increases the depth to the main above 2.5m will require WSC approval. Documentation to be provided to WSC in support of filling over a sewer must include certification from a suitably experienced qualified civil, structural or geotechnical engineer that

- The loading imposed will not adversely affect the underlying sewer, or
- The remediation work proposed will prevent any adverse loading on the underlying sewer

The placing of fill to excessive depths over WSC's main is not permitted (5m is a maximum depth for practical access) regardless of the structural capacity of the pipe. No fill is to be placed over sewer manholes. Manholes are to be raised in conjunction with any site filling. Finished lid levels of maintenance structures, relative to finished surface level, will be advised by WSC based on the land use and prevalence of flooding.

E24 *Excavations over and adjacent to mains*

Excavations

Generally excavations over or adjacent to a sewer main are not to reduce the earth cover over the main to less than the minimum limits as detailed in WSC's adopted Code of Practice for the design and construction of Sewerage Networks.

Any proposal to reduce cover over a sewer to less than the limits imposed in the code of practice will require specific WSC approval. Documentation to be provided to WSC in support of reducing cover over a sewer main must include, amongst other things, certification from a suitably experienced qualified civil, structural or geotechnical engineer certifying that

- The reduced cover is sufficient for potential surface loading to not adversely affect the underlying sewer loading imposed will not adversely affect the underlying sewer, or
- The remediation work(if any) proposed will prevent any expected loading over the sewer from having an adverse impact on the sewer

E25 *Earth embankments*

On sloping sites there is potential that earthworks down slope of an existing sewer main could present a risk for land slip or erosion of soil providing cover and/or side support to an existing sewer main.

Any proposed regrading of land immediately down slope of an existing sewer main should be designed with a slope no steeper than 3 (horizontal) to 1 (vertical) to ensure future erosion and/or land slip does not reduce cover and/or support to the existing sewer main. Steeper embankments would be permitted where the embankment is certified by a suitably experienced qualified civil, structural or geotechnical engineer and approved by WSC based on the certification.

Retaining walls may be required to provide support down slope of existing sewer mains if substantial regrading is proposed.

E26 *High Rise development*

High rise development can present numerous challenges for the ongoing operation and maintenance of sewer mains. The Applicant must consider the following additional items as a minimum.

E27 *Size considerations*

As a requirement, the location of the trunk mains of 300mm diameter and greater (in basement) will not be approved by WSC. Where such conflict occurs, the Applicant will be required to fund and arrange relocation (diversion) of the affected main to avoid such conflicts.

For mains of sizes less than 300mm diameter (in basement), WSC will examine each proposal on a case by case basis and reserves the right to decline approval requiring the Applicant to relocate (divert) the affected main.

If WSC does however approve a particular proposal, WSC may also set a range of conditions, as indicated in the following sections.

E28 *Access to secured/locked complexes or basement car parks*

Should sewer mains be located within such areas, access by WSC's staff must be available at all times. Details are to be provided that satisfy WSC's access requirements.

The WSC's access requirements are to be identified in the Strata Management Statement or similar.

E29 *Adequate clearances and locations for maintenance access*

Where sewers are located in basement car parks, they are to be located to ensure that adequate and clear access is provided all around the sewer for all maintenance and replacement activities. Adequate and safe clearances are to be provided for maintenance staff via the main access to and from basement car parks. This may require the widening of accesses and ramps or the provision of additional sight distance within access areas.

Car spaces may be required to be orientated or located such that unimpeded access is available to the sewer at all times.

E30 *Protection*

Should there be the likelihood of a vehicle impact to a sewer main, the main is to have adequate protection against such an impact. The proposed protection type, treatment, strength, etc shall be subject to approval by WSC. Should WSC consider that the proposed sewer location presents a high likelihood of being impacted; the sewer main may be required to be relocated elsewhere at full cost to the Applicant.

E31 *Design*

Any adjustment to sewer mains may have greater implications than solely to the area of the proposed development and as a result, no sewer main invert levels shall be raised. The raising of sewer mains may have significant impacts on the servicing potential of upstream properties.

Horizontal and vertical deflections may be permitted within the structure of the basements (e.g. pipes supported from the roof of the basement etc), however will not be permitted under or embedded in the concrete of the structures. Approved deflections shall not exceed 22.5°.

The deflections or sweeping bends are to be provided with cleaning/flushing "eyes". Where sewer mains are proposed to pass through (and out of) structures, the Applicant shall provide designs that allow for flexibility at joints and differential settlement. Such designs shall be subject to WSC's approval.

Consideration shall be given where possible for the effects of any possible future development or redevelopment of adjoining properties.

All designs for WSC sewer mains are to be in accordance with Water Services Association of Australia (WSA) – Sydney Water Version and WSC Supplement or as nominated by the Water Supply Authority (WSC).

Internal (Not WSC Asset) sewer designs are to comply with the requirements of AS/NZS 3500 and the BCA as appropriate.

Existing manholes where practical are to be retained to provide greater flexibility for maintenance inspection and access.

E32 Construction

Construction of WSC sewer mains shall be in accordance with Water Services Association of Australia (WSA) – Sydney Water Version and WSC Supplement.

Internal (not WSC asset) sewers shall be in accordance with AS/NZS 3500 and the BCA as appropriate.

Materials used for sewer mains within and adjacent to the structures (including those located within formwork) shall be ductile iron class (Flange) with stainless steel fittings unless otherwise approved. The work shall provide for joint types and locations so that such joints are easily accessed for replacement/maintenance works with the minimum disruption of the operation of the system.

E33 Safety / Health

All mains are to be clearly and frequently labelled for easy identification. Additional lighting in basement car parks may be required adjacent to the sewer mains for identification, maintenance and replacement.

E34 Abandoned mains

Pressure or gravity mains which have been abandoned due to relocation to suit a particular development may remain in the ground providing the abandoned mains are capped to prevent the movement of water. WSC may require certain abandoned mains to be backfilled with grout depending on size, material type and proximity to other structures.

Alternatively the abandoned mains are to be removed and the trench backfilled and compacted to at least 98% standard compaction. Note that Workcover requirements will govern the handling of any Asbestos Cement materials.

E35 Exemptions to policy

WSC may consider a development exempt from a number of conditions specified within this policy where **all** of the following situations exist concurrently:

- The development is an addition to an existing dwelling.
- The development is in excess of 2.0 metres horizontally from the sewer main.
- The sewer main is less than or equal to 300mm in diameter.
- the existing dwelling was constructed prior to construction of the sewer main and is located within the zone of influence without compliance with current building over or adjacent to sewer main requirements.
- The area of the proposed addition located within the zone of influence represents less than 25% of the combined area of existing and proposed development within the zone of influence.
- the owner requests in writing that the requirement for piercing of the additions for the sole purpose of complying with WSC building over or adjacent to sewer mains policy be removed and if accepted by WSC, the owner acknowledges in writing that the owner accepts responsibility for any future issues which may arise as a consequence of the additions and the sewer main.

E36 *Planting of trees*

Tree roots can penetrate into sewer mains through joints or damaged sections of pipes, causing blockages and subsequent overflows. As a result, certain species are not recommended to be planted near sewer mains. A list of the highest risk species is provided in Appendix 1.

E37 *Costs*

The Applicant will be responsible for all costs associated with

- All investigation and design and obtaining WSC acceptance of any proposal.
- If approval is granted then any construction costs
- Repairing any damage to a sewer main or associated sewer infrastructure caused by construction over or near an existing sewer.

If WSC decides to upsize a sewer main subject to relocation by an Applicant, then a cost sharing arrangement may be agreed to between both parties that reflects the extra costs associated with installing a larger diameter main at the time of relocation by the Applicant. Note this may not apply where the upsizing of the pipe is required due to the additional capacity required for the subject development.

The Applicant will have no claim on WSC for any costs incurred in the event that approval is not granted.

E38 *ENCLOSURE*

Plan No. 10168B detailing Zone of Influence from the sewer mains and the associated engineering requirements.

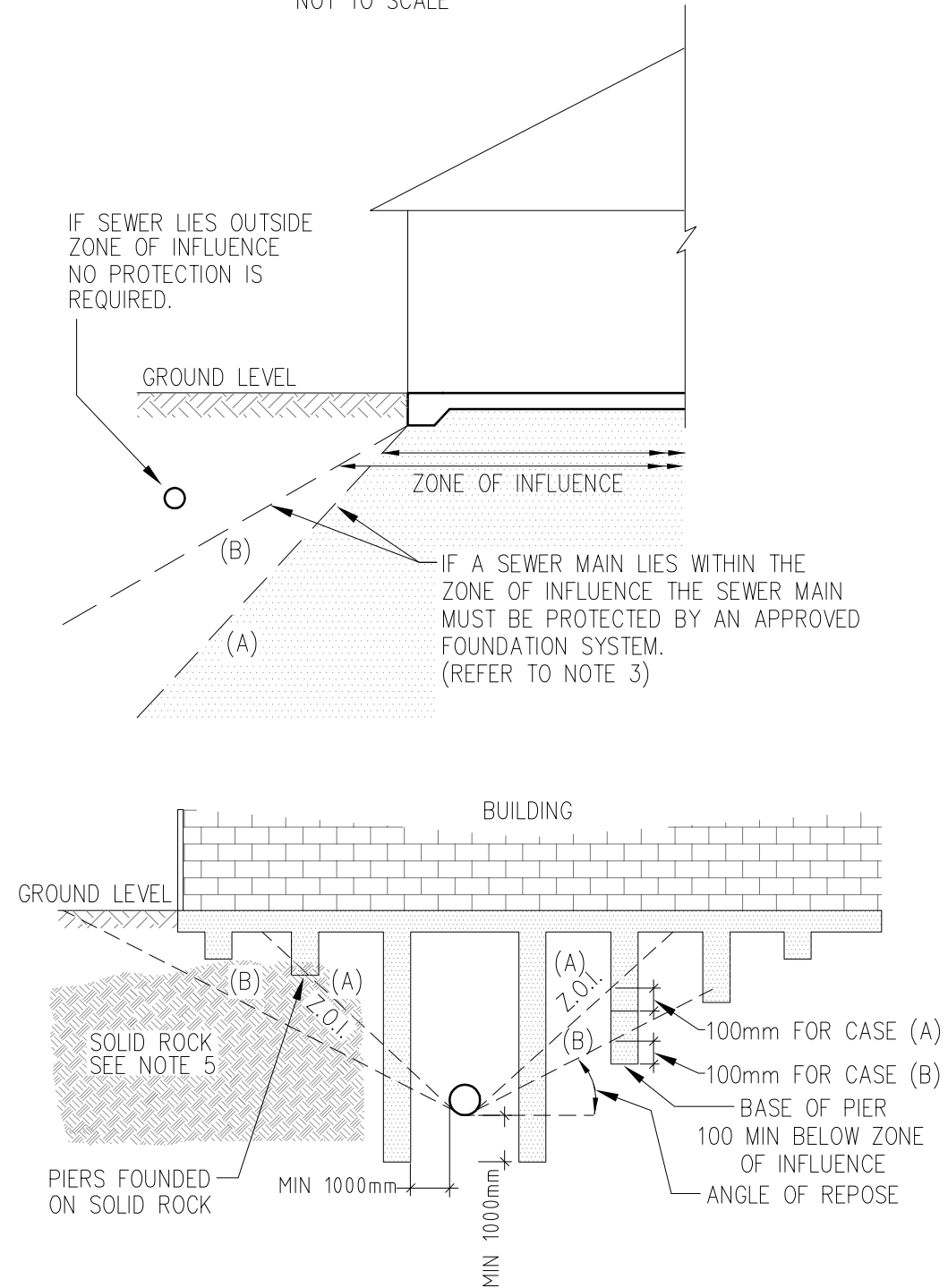
Appendices**Appendix 1: Plants to avoid near Sewer Mains**

Botanical name	Common Name	Damage rating
Cinnamomum camphora	Camphor Laurel	Extreme
Ficus species	Fig Trees & Rubber Plants	Extreme
Populus species	Poplars	Extreme
Salix species	Willows	Extreme
Erythrina species	Coral Trees	Very High
Eucalyptus species	Large Gum Trees	Very High
Jacaranda mimosifolia	Jacaranda	Very High
Liquidambar styraciflua	Liquidambar	Very High
Araucaria species	Norfolk Island & Bunya Pines	Very High
Brachychiton acerifolium	Illawarra Flame Tree	Very High
Casuarina species	Casuarinas	Very High
Melia azedarach	Australian White Cedar	Very High
Pinus species	Pine Trees	Very High
Platanus acerifolia	Plane Tree	Very High
Schinus molle	Pepper Tree	Very High
Ulmus species	Elms	Very High
Bougainvillea species	Bougainvilleas	High
Cortaderia selloana	Pampas Grass	High
Grevillea robusta	Silky Oak	High

Ilex species	Hollies	High
Lagunaria patersonii	Norfolk Island Hibiscus	High
Ligustrum species	Privets	High
Magnolia species	Magnolias	High
Nerium oleander	Oleander	High
Phoenix canariensis	Canary Island Date Palm	High
Phyllostachus species	Bamboos	High
Toxicodendron species	Rhus Trees	High
Lophostemon confetus	Brush Box, Tristania	High
Wisteria species	Wisteria	High

CATEGORY 1. HEAVYWEIGHT STRUCTURES

NOT TO SCALE



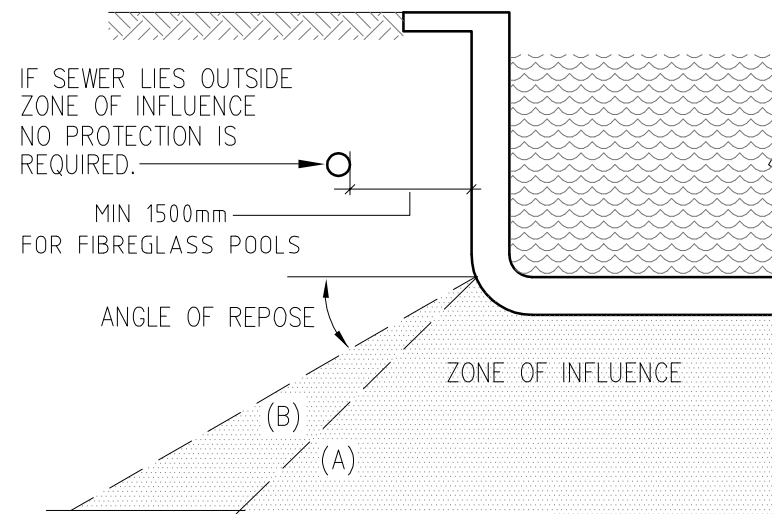
NOTES:

- (A). FOR SOIL, CLAY ETC., ZONE OF INFLUENCE 1:1 (45°)
- (B). FOR SAND, LOAM OR FILLED GROUND, ZONE OF INFLUENCE 2:1 (30°)

EXAMPLE ONLY

CATEGORY 3. INGROUND SWIMMING POOL

(REINFORCED CONCRETE OR FIBRE GLASS)
NOT TO SCALE



IF A SEWER MAIN LIES WITHIN THE ZONE OF INFLUENCE, SUPPORT OF THE POOL TO BE DESIGNED BY A QUALIFIED STRUCTURAL ENGINEER

NOTES:

1. IT WILL BE THE RESPONSIBILITY OF THE APPLICANT TO DETERMINE THE EXACT LOCATION OF THE SEWER MAIN, WHICH MAY AFFECT OR BE AFFECTED BY THE PROPOSED STRUCTURE. COUNCIL'S PLANS ARE ONLY TO BE USED TO DETERMINE GENERAL LOCALITY OF SEWER MAINS. (REFER TO NOTE 7)
2. COUNCIL WILL NOT ALLOW STRUCTURES BE LOCATED OVER SEWER MANHOLES OR LAMPHOLES. A MINIMUM OF 1.5 METRES CLEARANCE IS TO BE MAINTAINED FROM THE EDGE OF MANHOLES AND LAMPHOLES.
3. PROPOSALS FOR PROTECTION OF SEWER MAINS (FOR CATEGORY 1 AND 3) USING PIERS, PILES OR OTHER FOUNDATION SYSTEMS MUST BE DESIGNED BY A QUALIFIED STRUCTURAL ENGINEER. PROPOSALS MUST BE APPROVED BY COUNCIL.
4. FOR STRUCTURES COMPLYING WITH CATEGORY 2 AND LOCATED WITHIN ZONE OF INFLUENCE OF THE SEWER MAINS THE SLAB/FOOTING OF SUCH STRUCTURES MUST BE SELF SUPPORTING WITHIN THE ZONE OF INFLUENCE OF THE SEWER MAIN. A QUALIFIED STRUCTURAL ENGINEER MUST DESIGN THE SLAB/FOOTING OF SUCH STRUCTURES. THIS DRAWING SPECIFIES MINIMUM REQUIREMENTS.
5. PIERS OR PILES FOR THE FOUNDATION OF CATEGORY 1 AND 3 STRUCTURES AND LOCATED ADJACENT TO THE SEWER MAIN AND WITHIN THE ZONE OF INFLUENCE OF THE MAIN, MUST BE CONSTRUCTED TO AT LEAST 1000mm BELOW THE INVERT OF THE SEWER MAIN OR TO A SOLID ROCK STRATA (SAFE BEARING CAPACITY OF 240KPa OR HIGHER). OTHER PIERS MUST EXTEND AT LEAST 100mm BELOW THE ZONE OF INFLUENCE.
6. THE MINIMUM DISTANCE BETWEEN PIERS OR PILES AND THE SIDE OF THE SEWER MAIN IS TO BE 1000mm.
7. THIS PLAN IS TO BE USED IN CONJUNCTION WITH COUNCIL'S REQUIREMENTS "BUILDING OVER AND ADJACENT TO SEWER MAINS"

MICROFILM		Surveyed By	Scale		BUILDING OVER AND ADJACENT TO COUNCIL'S SEWER MAINS						
YES:	NO: <input checked="" type="checkbox"/>	Job No	NOT TO SCALE		ENGINEERING REQUIREMENTS						
APPROVED:		Disk No 1265			APPROVED BY		Date	Datum	Sheet No	No of Sheets	Plan No
DATE: 5-10-2007		Drawn By M. HODGE			DIRECTOR OF ENGINEERING SERVICES				1	1	10168B
		Checked By	WYONG SHIRE COUNCIL								
		Passed By									