



BUILDING IN THE VICINITY OF SEWER MAINS **GUIDELINES**

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Contents

1. Objective	4
2. Consideration of build over sewer requests	4
Relocation of proposed building	4
Relocation - Gravity mains	4
Relocation - Rising mains	4
Relocation - Easements	4
Building over sewer	4
CCTV Inspection	5
Results of the CCTV Inspection	5
3. Where the policy applies	5
4. Category of structures	5
Category 1 - Heavy or permanent structures	5
Category 2 - Lightweight or semi-permanent structures	6
Category 3 - Miscellaneous	6
Category 4 - High rise development	6
5. Construction not permitted	7
6. Indemnity	7
7. Asset protection measures	7
Concrete encasement	7
Piering of foundations	8
8. Zone of influence	8
9. Clearances from access structures	9
Access requirements	9
10. Existing encumbrances	9
11. Swimming Pools	10
Above ground swimming pool	10
In-ground swimming pool	10
In-ground Fibreglass pool	10
In-ground Concrete pool	10
12. Retaining walls	10
13. Filling over sewer mains	11
14. Excavations over and adjacent to mains	11
Excavations	11
Earth embankments	11
15. High Rise Development	11
Sizing	11
Access to secured/locked complexes or basement car parks	12
Adequate clearances and locations for maintenance access	12
Protection	12
Design	12
Construction	13
Safety / Health	13
16. Abandoned mains	13
17. Planting of trees	13
18. Costs	13
19. APPENDIX 1 – PLANTS TO AVOID NEAR SEWER MAINS	14

1. Objective

As a Local Water Utility (LWU), Hawkesbury City Council has prepared the building in the vicinity of sewer mains guidelines with the objective to protect existing and future assets from potential damage. This policy also looks at allowing access for repairs, upgrades, and inspection LWU's assets.

2. Consideration of build over sewer requests

Any application to Council to build adjacent/over sewer mains will only be considered if the alternative options outlined below are found to be not viable.

Council's approach to building in the vicinity of sewer requests is as follows:

- Relocate proposed structure
- Relocate Utility's affected assets
- Provide protection measures and build over/adjacent to asset

It is the developer's responsibility to investigate and document the above options, in consultation with Council. Some guidance regarding the above options is provided below.

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 assets may be considered.

Relocation of assets

Council 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 or functionality of the assets is not reduced. All costs associated with the relocation of assets are to be funded by the developer/applicant.

Relocation - Gravity mains

Where approval to relocate a sewer is granted the Developer/Applicant will be required to submit plans in accordance with Council's design guidelines. Relocating the sewer following approval is required before construction of the proposed building/structure can commence. The applicant will need to liaise with Council regarding the bypassing of live sewage flows.

Relocation - Rising mains

Where approval to relocate a rising main is granted the Developer/Applicant will be required to submit plans in accordance with Council's design guidelines. 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 Council regarding the bypassing of live sewage flows.

Relocation - Easements

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

Building over sewer

The LWU 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.

The Developer /Applicant shall consider an integrated approach and demonstrate that all associated risks can be managed with marginal costs if building over a sewer main is to be considered and accepted by Council. All costs associated with the works are to be funded by the developer/applicant.

CCTV Inspection

Any application to build over a sewer must include the following:

A CCTV inspection of the subject sewer, undertaken by a contractor qualified and with the necessary experience to do so.

The results of the CCTV inspection are to be submitted to Council with the application. The inspection may be used as a dilapidation survey, with the developer required to fully fund any repair work required to rectify damage caused by their development.

Results of the CCTV Inspection

Depending on the results of the CCTV inspection Council may require the Developer/Applicant to:

Reconstruct the sewer main in its existing location using construction materials as specified by Council and in accordance with requirements set down within Council's 'Standard specification construction and testing of sewerage works' 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 Council for approval prior to work commencing.

All works on gravity sewer mains must be completed for the full extent between manholes.

3. Where the policy applies

This building in vicinity of sewer mains policy applies to the following four structure types:

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

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

4. Category of 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 workplace.
- 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 LWU assets. Asset protection measures as outlined in Section 7, 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 Council, will be at the full cost of the owner. See Section 6 on Indemnity.

Category 3 – Miscellaneous

Structures in this Category do not normally require protection of the sewer mains.

Structures in this Category include:

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

If 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 Council.

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 Council 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 11 and Retaining Walls are discussed in Section 12.

Category 4 – High rise development

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

Section 15 identifies the issues and how they are to be addressed through the assessment, design, construction, and operational phases to ensure Council's interests are satisfied.

5. Construction not permitted

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

- Sewer rising mains, surcharge mains and critical gravity mains (generally all sewer mains of greater diameter than 300 mm mains and/or deemed to be excessively deep i.e. greater than 3.0 m), as determined by Council.
- Any gravity sewer that, in the opinion of the utility, 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 developers cost.
- Sewer manholes, lampholes, maintenance points and junctions where sufficient clearances cannot be achieved. (See Section 9)
- No building within Council easements.

6. Indemnity

Where an indemnity applies, it will be recorded on Council's property information files.

With regard to Category 2 structures, the property owner must indemnify Council against all costs associated with the removal and/or subsequent re-erection of the subject structure and give an undertaking to remove the structure when required to do so by Council.

In case of an emergency, Council may remove the structure to gain access to the sewer and Council shall not be held responsible for damage to the structure. The cost of such removal and subsequent re-erection of the subject structure will be borne by the property owner.

With regard to substantial structures, Council will not be held responsible for any damage to the structure built over or adjacent to a sewer main, in the event the main needs to be repaired.

7. 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 8), Council may request the developer to carry out any combination of the following protection measures:

- Concrete encasement
- Piering of foundations

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

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 Council minimum cover requirements cannot be met.

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

- 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.
- In trenches of material other than rock, encasing is to extend 150 mm under, on both sides and on top of the pipe barrel. For trenches in rock, encasing is to extend 100 mm under the pipe barrel, 150 mm on top of the pipe barrel and for the full width of the excavated trench.

- 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 1000 mm on 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).
- If a manhole is less than 2 m from the end of encasement, as required above, the encasement is to be extended up to the second flexible joint from that manhole.
- Backfilling of the trench with suitable material as per specification must not commence until at least 48 hours after placing the concrete.
- 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.
- Sewer junctions that are permitted to be incorporated in proposed concrete encasement are to be upgraded to a rubber ring jointed junction to maintain flexibility at the junction branch.
- 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.

All costs associated with concrete encasements are to be borne by the developer. Council works inspectors must be present when encasement work is being carried out.

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 piers:

- The building and its foundations are to be designed in such a way that no building loads are transmitted to the utility's sewer and where possible, the pipe can be repaired or replaced at any time without affecting the stability of the building.
- Foundations within an assets zone of influence will require piers to a minimum depth of 150 mm below the zone of influence of the affected asset or until solid rock is encountered.
- A minimum horizontal clearance of 1 m 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 Council and may require additional clearances to existing assets as directed.

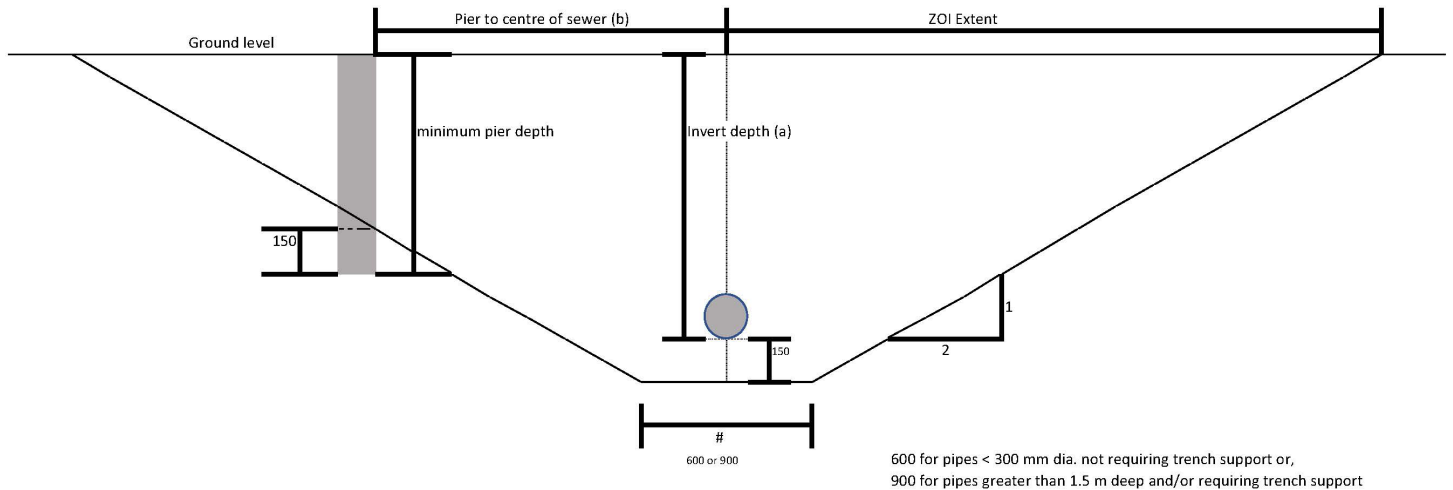
8. Zone of influence

The Zone of Influence (ZOI) 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:

- Settlement or disturbance of the ground surrounding the pipe may cause damage to buildings or structures on the surface above.
- 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 150 mm below the invert of the sewer main and half of the trench width measured horizontally from the pipe's centreline (See figure below)

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



When angle is 2:1

$$ZOI\ extent_{2:1} = a + 300 + \frac{\#}{2}$$

$$Pier\ Depth_{2:1} = a + 300 + \frac{\#}{4} - \frac{b}{2}$$

Where:

a is invert depth

When angle is 1:1

$$ZOI\ extent_{1:1} = a + 150 + \frac{\#}{2}$$

$$Pier\ Depth_{1:1} = a + 300 + \frac{\#}{2} - b$$

Where:

- a is inverted depth
- b is distance of pier to sewer centre
- # is the trench width - 600 for pipes < 300 mm dia. not requiring trench support or,
- 900 for pipes greater than 1.5 m deep and/or requiring trench support

9. 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 1.5 m is required around existing access structures as well as a minimum vertical clearance of 3 m. The horizontal setback shall increase to 2 m if two or more sides of an access structure are built around. The fourth side must be open and accessible at all times.

Access requirements

Council 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 m wide clear access to the sewer structures i.e. along the boundary between fence and building.

This is necessary to allow Council's 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 Council sewer operations staff for maintenance or emergency work.

10. Existing encumbrances

Where structures have been built over an underground pipeline without Council approval then Council 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 line for maintenance or repair work Council 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 Council, to be built over a pipeline then no further extensions, additions or reconstructions will be allowed without further assessment. Council recognises that the existing structure presents a risk to both the building and Council's liability. Therefore, Council will assess each structure on its own merit to give permission for additions.

11. 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 if 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 '**In-ground swimming pool**'.

In-ground swimming pool

In-ground Fibreglass pool

The following requirements apply to fibreglass pools:

- Minimum horizontal clearance from the pool to the face of sewer pipe of 1.5 m
- If a fibreglass pool is constructed within the zone of influence of a sewer main it should be designed and certified as being self-supporting with foundations founded below the zone of influence.
- No pool shall be located closer than 1.5 m 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 1 m.
- 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 (e.g. piers) to ensure the pool is self-supporting.
- No pool shall be located closer than 1.5 m to a sewer maintenance structure (manholes etc).

12. 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 7.
- Generally, walls over 1.0 m in height would not be permitted within 1.0 m 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 1.0 m 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 3.0 m 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 7 to ensure no loads from the wall are transferred to the sewer main i.e. bridging slab foundation.

13. Filling over sewer mains

The allowable depth of fill that can be placed over a sewerage main depends on the material type and stiffness class of the existing pipe. Site filling that increases the depth to the main above 2.5 m will require an application to Council and subsequent approval. Any application must include certification from 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 Council'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 and manholes are to be raised in conjunction with any site filling. Finished lid levels of maintenance structures, relative to ground level, will be advised by Council based on the land use and prevalence of flooding.

14. 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 Council's 'Standard Specification construction and testing of sewerage works'.

Any proposal to reduce cover over a sewer to less than the limits imposed in these guidelines will require an application to Council and subsequent approval. Any application must include, amongst other things, 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

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 Council.

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

15. High Rise Development

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

Sizing

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

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

If Council does however approve a particular proposal, Council may also set a range of conditions, as indicated below.

Access to secured/locked complexes or basement car parks

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

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

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 from the normal operation of the 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 always available to the sewer.

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 Council. Should Council 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 developer.

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 developer shall provide designs that allow for flexibility at joints and differential settlement. Such designs shall be subject to Council's approval.

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

All designs for Council sewer mains are to be in accordance with Water Services Association of Australia (WSAA)

Internal (domestic) sewer designs are to comply with the requirements of AS/NZS 3500 and the Building Code of Australia (BCA) as appropriate.

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

Construction

Construction of Council sewer mains shall be in accordance with WSAA.

Internal (domestic) sewers shall be in accordance with AS/NZS 3500 and the BCA as appropriate.

Materials used for sewer work within and adjacent to the structures 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.

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.

16. 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 Council 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.

17. Planting of trees

Tree roots can penetrate sewerage pipes 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.

18. Costs

The Developer/Applicant will be responsible for all costs associated with:

- All investigation and design and any costs associated with seeking approval
- 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 Council decides to upsize a sewer main subject to relocation by a developer, then a Council may pay the difference in costs associated with installing a larger diameter main at the time of relocation by the developer. Note this may not apply where the upsizing of the pipe is required due to the subject development.

The Developer/Applicant will have no claim on Council for any costs incurred if approval is not granted.

19. APPENDIX 1 – PLANTS TO AVOID NEAR SEWER MAINS

Botanical Name	Common Name	Damage Rating
<i>Cinnamomum camphora</i>	Camphor Laurel	Extreme
<i>Ficus</i> species	Fig Trees & Rubber Plants	Extreme
<i>Populus</i> species	Poplars	Extreme
<i>Salix</i> species	Willows	Extreme
<i>Erythrina</i> species	Coral Trees	Very High
<i>Eucalyptus</i> species	Large Gum Trees	Very High
<i>Jacaranda mimosifolia</i>	Jacaranda	Very High
<i>Liquidambar styraciflua</i>	Liquidambar	Very High
<i>Araucaria</i> species	Norfolk Island & Bunya Pines	Very High
<i>Brachychiton acerifolium</i>	Illawarra Flame Tree	Very High
<i>Casuarina</i> species	Casuarinas	Very High
<i>Melia azedarach</i>	Australian White Cedar	Very High
<i>Pinus</i> species	Pine Trees	Very High
<i>Platanus acerifolia</i>	Plane Tree	Very High
<i>Schinus molle</i>	Pepper Tree	Very High
<i>Ulmus</i> species	Elms	Very High
<i>Bougainvillea</i> species	Bougainvilleas	High
<i>Cortaderia selloana</i>	Pampas Grass	High
<i>Grevillea robusta</i>	Silky Oak	High
<i>Ilex</i> species	Hollies	High
<i>Lagunaria patersonii</i>	Norfolk Island Hibiscus	High
<i>Ligustrum</i> species	Privets	High
<i>Magnolia</i> species	Magnolias	High
<i>Nerium oleander</i>	Oleander	High
<i>Phoenix canariensis</i>	Canary Island Date Palm	High
<i>Phyllostachus</i> species	Bamboos	High
<i>Toxicodendron</i> species	Rhus Trees	High
<i>Lophostemon confertus</i>	Brush Box, Tristania	High
<i>Wisteria</i> species	Wisteria	High





Hawkesbury City Council
366 George Street (PO BOX 146)
Windsor NSW 2756
(02) 4560 4444 | (02) 4587 7740 | DX 8601 WINDSOR
council@hawkesbury.nsw.gov.au
www.hawkesbury.nsw.gov.au