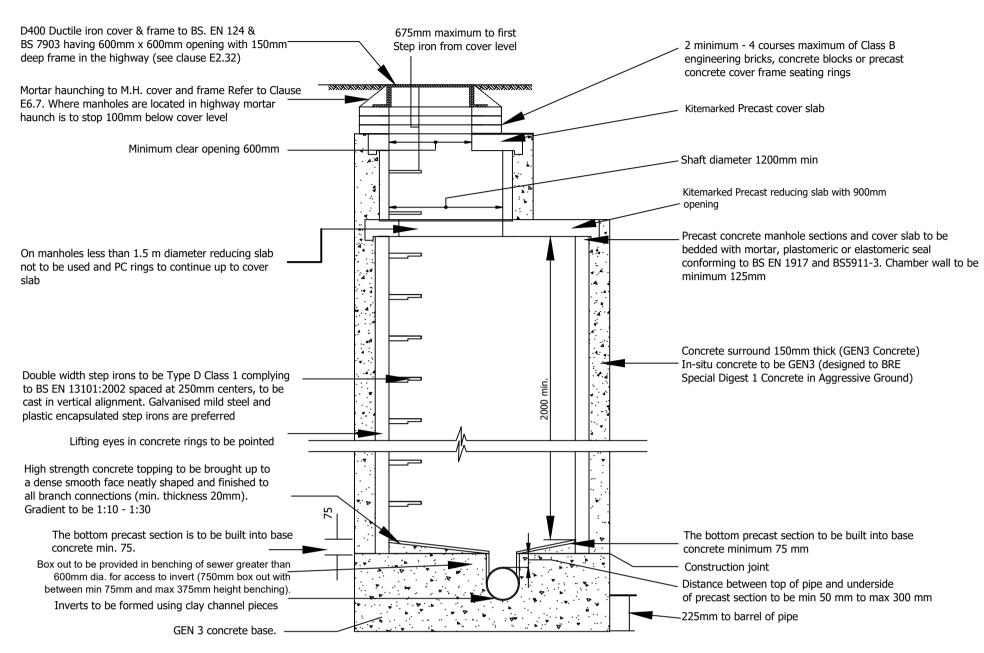
Typical Manhole Construction

Type A1 (Design and Construction Guidance)

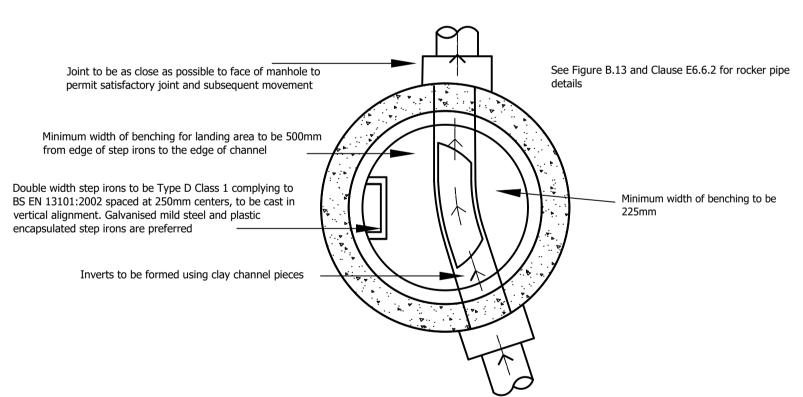
For use on manholes of depth from cover level to soffit level between 3000mm and 6000mm



Section View

Typical Manhole Plan View

Type A & B (Design and Construction Guidance)

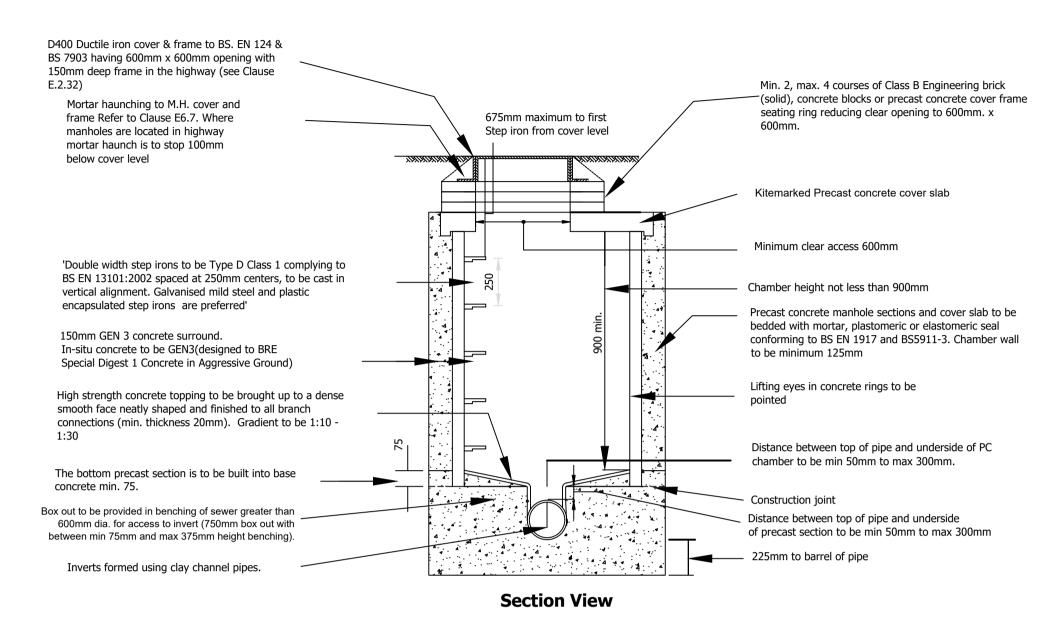


Manhole Diameters		
Nominal internal diameter of largest pipe in manhole (mm)	Minimum nominal internal dimension of manhole (mm)	
Up to 300	1200	
375-450	1350	
500-700	1500	
750-900	1800	
Greater than 900	Specific detailed drawing required	

Typical Manhole Construction

Type B (Design and Construction Guidance)

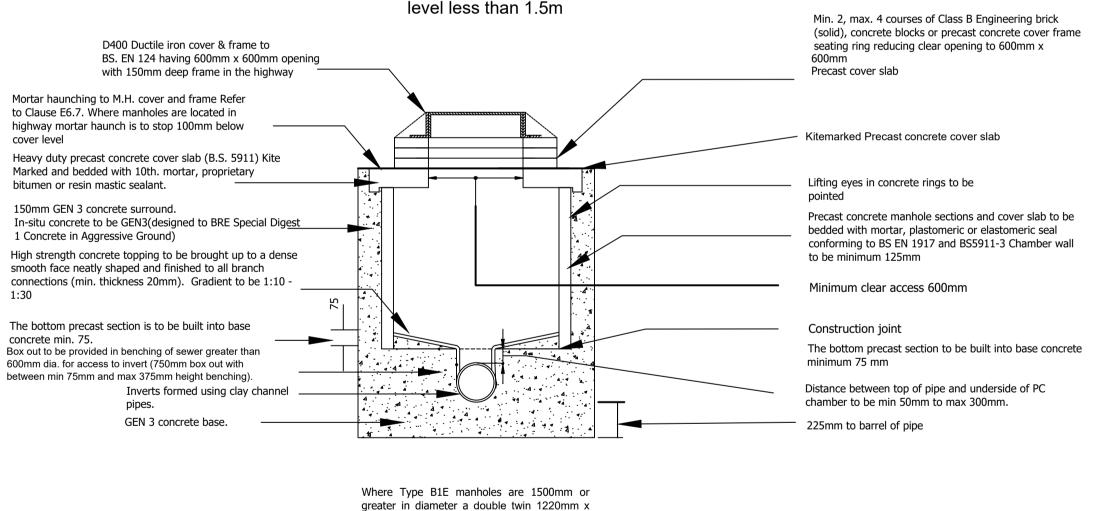
Maximum depth from cover level to sofit of pipe 3000mm



Shallow Manhole Construction

Type C (Design and Construction Guidance)

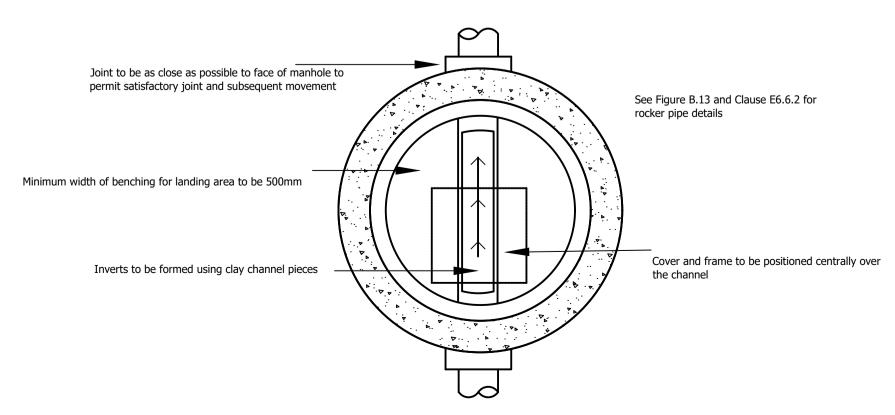
Construction of manhole where depth from sofit to cover



Shallow Manhole Plan View

675mm cover and frame is required directly

Type C (Design and Construction Guidance)



Yorkshire Water Notes

- 1. All adoptable sewer works and material to be in accordance with Design and Construction Guidance, The Relevant British/European and Yorkshire Water's Standards/Requirements/Addendum to the Mechanical and Electrical Specification and Kitemarked.
- 2. Manhole covers shall/must have a clear opening of 600mm and shall be Class D400 to BS EN 124 with 150mm deep frames in highways.
- 3. Filled ground must be filled and consolidated under the supervision and to the satisfaction of Yorkshire Water before any sewer works are carried out.
- 4. Yorkshire Water is <u>not</u> obliged to accept filter drain/land drainage run-off into the public sewer network or adoptable drainage system (directly or in-directly). An alternative method of disposal of the land drainage run-off will therefore be required and you will have to liaise with the Local Authority, Land Drainage Section with regard to the disposal of the filter drain/land drainage run-off.
- 5. Cover slabs must carry the BSI Kitemark or will be rejected by Yorkshire Water Inspector. Where the clear opening of the Kitemarked product is different to that of the cover and frame, a loading bearing slab should be fitted above the cover slab to bring the size down to 600mm x 600mm for the Yorkshire Water specified cover size. Please refer to Concrete Pipe Systems Association (CPSA), 'Technical Bulletin' issued Autumn 2004 for Kitemarked cover slab opening sizes.
- 6. Sulphate resistant cement (**C20-DC2**) and precast concrete products must be used or a laboratory report provided proving that such precautions are not necessary.
- 7. The adoptable sewers should be a minimum of 1m and manholes 0.5m from kerb faces and service margins.
- 8. "Sewers must have 5 metres clearance from trees and hedges (please also refer to the Design and Construction Guidance for restrictions on tree planting adjacent to sewers)".
- 9. Sewers to be laid in Class "S" Bedding (150mm granular bed and surround). Where depth of cover to top of the sewer is less than 1.2m in highways and verges (or less than 900mm in none vehicular access areas) then a concrete slab should be provide above granular bed and surround.
- 10. Bedding and backfill material to conform to the requirement of Water Industry Specification 4-08-02 (**Table A2**).
- 11. The chamber size of manholes with more than one connection in them may need to be increased an increment to accommodate the connections and bends.
- 12. Yorkshire Water policy is not to accept Type "C" brick manholes and 1050mm dia manhole rings. Instead it is preferred that you use a Type "B" manhole with 1200mm dia or 1500mm dia rings, with the opening sited over the channel where depth of cover to pipe soffit is 1 1.5m.
- 13. Adoptable plastic sewer pipes to be BSI Kitemarked (certified to WIS 4-35-01 and BS/EN13476). Adoptable plastic sewer pipes to be laid in maximum 3 metre lengths unless there is a specific operational need to lay longer lengths. Plastic channel sections in manholes are not acceptable and Yorkshire Water would prefer clayware channel in manholes. We have found that plastic channels are difficult to set in concrete because they float and a satisfactory finish cannot be obtained on the benching.
- 14. Where a B125 cover and frame has been approved, this <u>must not</u> be coated in plastic and must have lifting eyes suitably sized to accommodate standard lifting keys. Screw down covers are not acceptable.

For all clause and table references please refer to the Design and Construction Guidance contained within the Code for Adoption

Title	Typical Manhole Details
Drawing No	YW-DS-001
Revision	-
Date	April 2020

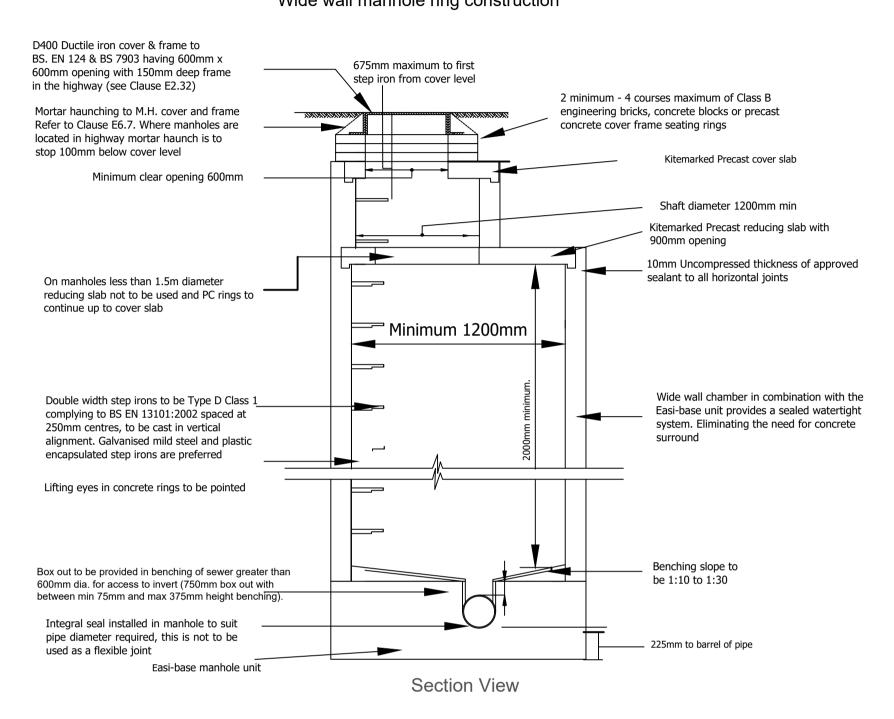


Typical Widewall Manhole Construction

Type A2 Alternative Wide Wall Manhole Construction

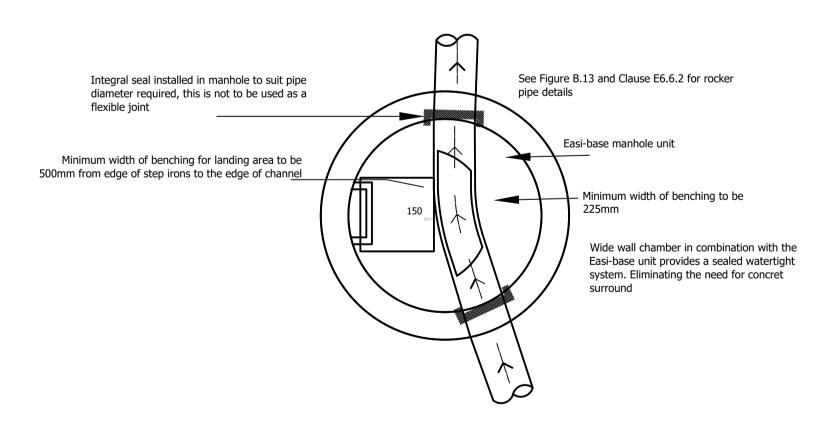
(Design and Construction Guidance)

For use on manholes of depth from cover level to soffit level between 3000mm and 6000mm. Wide wall manhole ring construction



Typical Widewall Manhole Plan View

Type A & B (Design and Construction Guidance)



Manhole Diameters		
Nominal internal diameter of largest pipe in manhole (mm)	Minimum nominal internal dimension of manhole (mm)	
Up to 300	1200	
375-450	1350	
500-700	1500	
750-900	1800	
Greater than 900	Specific detailed drawing required	

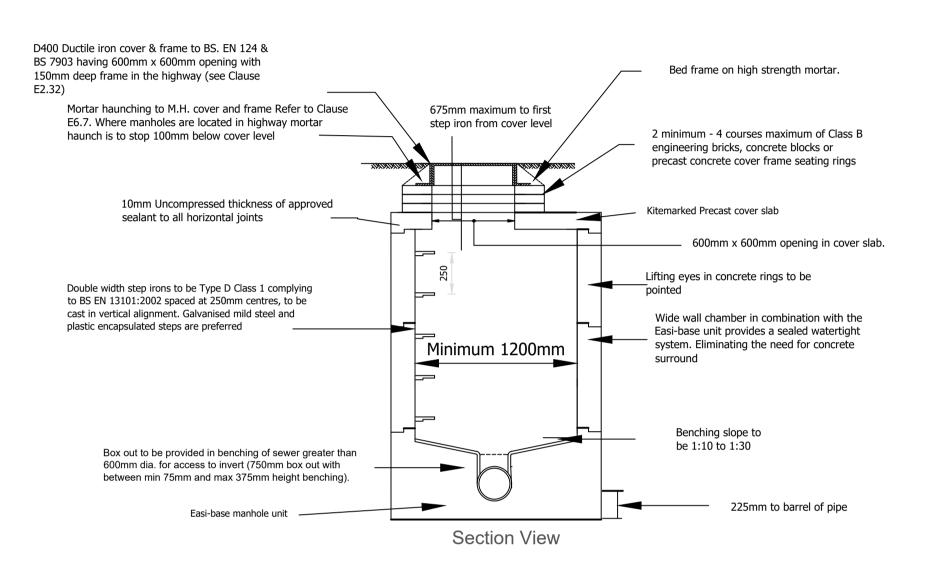
PLEASE NOTE WHERE
MANHOLES HAVE
BACKDROP CONNECTIONS
A FULL 150MM CONCRETE
SURROUND TO THE
MANHOLE IS REQUIRED

Typical Widewall Manhole Construction

Type B Alternative Wide Wall Manhole Construction

(Design and Construction Guidance)

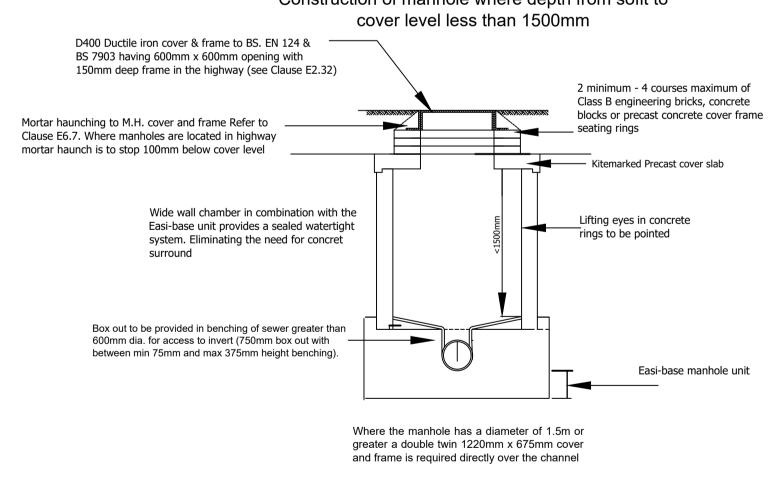
Maximum depth from cover level to sofit of pipe 3000mm
Wide wall manhole ring construction



Shallow Manhole Construction

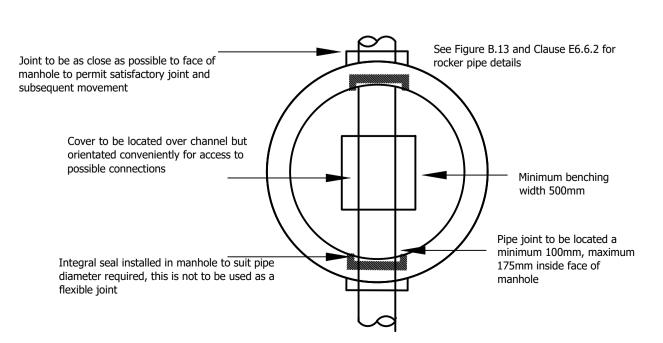
Type C Alternative Wide Wall Manhole Construction

(Design and Construction Guidance)
Construction of manhole where depth from sofit to



Shallow Widewall Manhole Plan View

Type C (Design and Construction Guidance)



Yorkshire Water Notes

- . All adoptable sewer works and material to be in accordance with the Design and Construction Guidance, The Relevant British/European and Yorkshire Water's Standards/Requirements/Addendum to the Mechanical and Electrical Specification and Kitemarked.
- 2. Manhole covers shall/must have a clear opening of 600mm and shall be Class D400 to BS EN 124 with 150mm deep frames in highways.
- 3. Filled ground must be filled and consolidated under the supervision and to the satisfaction of Yorkshire Water before any sewer works are carried out.
- 4. Yorkshire Water is <u>not</u> obliged to accept filter drain/land drainage run-off into the public sewer network or adoptable drainage system (directly or in-directly). An alternative method of disposal of the land drainage run-off will therefore be required and you will have to liaise with the Local Authority, Land Drainage Section with regard to the disposal of the filter drain/land drainage run-off.
- 5. Cover slabs must carry the BSI Kitemark or will be rejected by Yorkshire Water Inspector. Where the clear opening of the Kitemarked product is different to that of the cover and frame, a loading bearing slab should be fitted above the cover slab to bring the size down to 600mm x 600mm for the Yorkshire Water specified cover size. Please refer to Concrete Pipe Systems Association (CPSA), 'Technical Bulletin' issued Autumn 2004 for Kitemarked cover slab opening sizes.
- 6. Sulphate resistant cement (**C20-DC2**) and precast concrete products must be used or a laboratory report provided proving that such precautions are not necessary.
- 7. The adoptable sewers should be a minimum of 1m and manholes 0.5m from kerb faces and service margins.
- 8. "Sewers must have 5 metres clearance from trees and hedges (please also refer to the Design and Construction Guidance for restrictions on tree planting adjacent to sewers)".
- 9. Sewers to be laid in Class "S" Bedding (150mm granular bed and surround). Where depth of cover to top of the sewer is less than 1.2m in highways and verges (or less than 900mm in none vehicular access areas) then a concrete slab should be provide above granular bed and surround.
- 10. Bedding and backfill material to conform to the requirement of Water Industry Specification 4-08-02 (**Table A2**).
- 11. The chamber size of manholes with more than one connection in them may need to be increased an increment to accommodate the connections and bends.
- 12. Yorkshire Water policy is not to accept Type "C" brick manholes and 1050mm dia manhole rings. Instead it is preferred that you use a Type "B" manhole with 1200mm dia or 1500mm dia rings, with the opening sited over the channel where depth of cover to pipe soffit is 1 1.5m.
- 13. Adoptable plastic sewer pipes to be BSI Kitemarked (**certified to WIS 4-35-01** and BS/EN13476). Adoptable plastic sewer pipes to be laid in maximum 3 metre lengths unless there is a specific operational need to lay longer lengths. Plastic channel sections in manholes are not acceptable and Yorkshire Water would prefer clayware channel in manholes. We have found that plastic channels are difficult to set in concrete because they float and a satisfactory finish cannot be obtained on the benching.
- 14. Where a B125 cover and frame has been approved, this **must not** be coated in plastic and must have lifting eyes suitably sized to accommodate standard lifting keys. Screw down covers are not acceptable.

For all clause and table references please refer to the Design and Construction Guidance contained within the Code for Adoption

Title	Widewall Manhole Details
Drawing No	YW-DS-002
Revision	-
Date	April 2020



DEMARCATION CHAMBER LOCATED IN GARDENS DETAIL

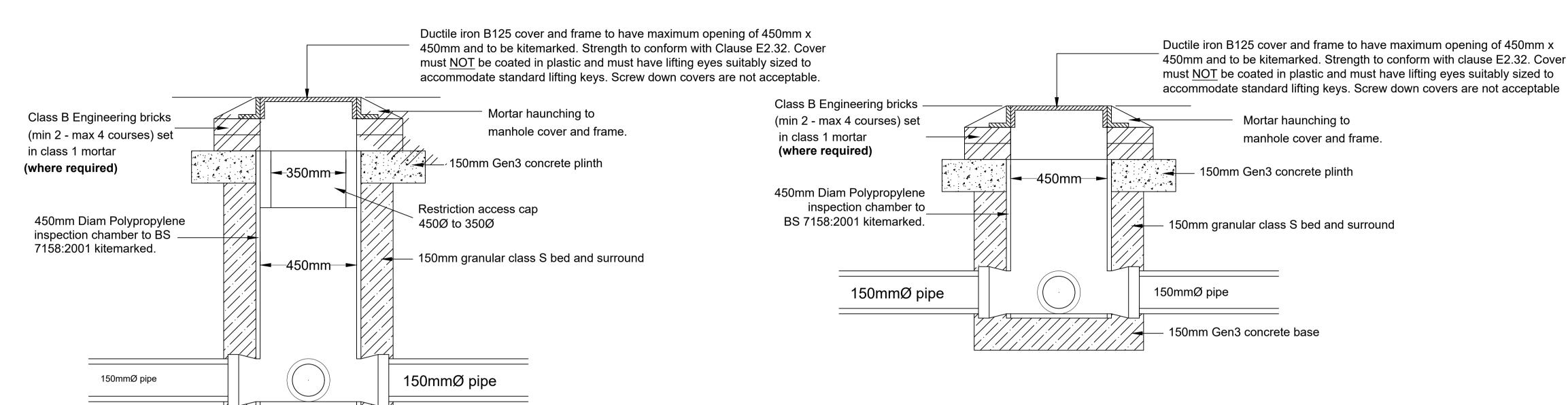
Depth from cover level to invert level of pipe chamber greater than 1200mm (maximum depth 2000mm).

Maximum lateral drain diameter 150mm

DEMARCATION CHAMBER LOCATED IN GARDENS DETAIL

Depth from cover level to invert level of pipe chamber less than 1200mm.

Maximum lateral drain diameter 150mm



DEMARCATION CHAMBER LOCATED IN DRIVEWAY

150mm granular class S base

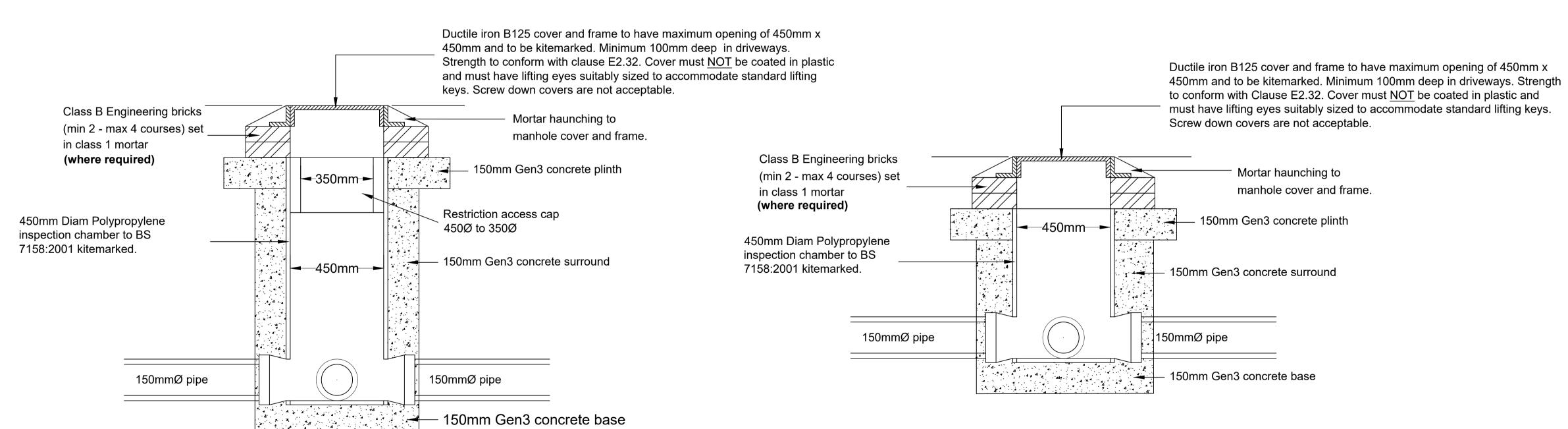
Depth from cover level to invert level of pipe chamber greater than 1200mm (maximum depth 2000mm).

Maximum lateral drain diameter 150mm

DEMARCATION CHAMBER LOCATED IN DRIVEWAY

Depth from cover level to invert level of pipe chamber less than 1200mm.

Maximum lateral drain diameter 150mm



Pipes

Diameter (mm)	Gradient	
	Foul	S.W.
100	1:80	-
150	1:80	1:80

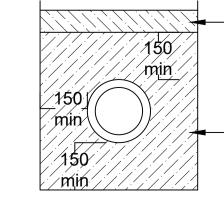
Vitrified clay pipes to BS EN 295 kitemarked. Unplasticised PVC pipes to BS 4660:200 & BS EN 1401-1 kitemarked. Structured Wall Unplasticised PVC pipes to WIS 4-35-01 kitemarked.

Demarcation chamber covers & frames

Surface	Class (Loading in kN)	Loading
Road	D400	Vehicle Impact
Footway & Driveway	B125	Occasional vehicle loading
Gardens	B125	Pedestrian/cyclist

Minimum depth of Lateral drains

Location	Minimum Depth (m)
Gardens	0.9
Agricultural/Open spaces Driveways (trafficked areas)	0.9 1.2 (see detail)



Trench fill under roads to conform with Highways requirements.

LATERAL DRAIN BEDDING DETAIL

Single-size granular material.

10mm for 100mmØ pipes.

10 or 14mm for 150mmØ pipes.

14 or 20mm for 225mmØ pipes.

Yorkshire Water Notes

- 1. All adoptable sewer works and material to be in accordance with the Design and Construction Guidance, The Relevant British/European and Yorkshire Water's Standards/Requirements/Addendum to the Mechanical and Electrical Specification and Kitemarked.
- Manhole covers shall/must have a clear opening of 600mm and shall be Class D400 to BS EN 124 with 150mm deep frames in highways.
- 3. Filled ground must be filled and consolidated under the supervision and to the satisfaction of Yorkshire Water before any sewer works are carried out.
- 4. Yorkshire Water is <u>not</u> obliged to accept filter drain/land drainage run-off into the public sewer network or adoptable drainage system (directly or in-directly). An alternative method of disposal of the land drainage run-off will therefore be required and you will have to liaise with the Local Authority, Land Drainage Section with regard to the disposal of the filter drain/land drainage run-off.
- 5. Cover slabs must carry the BSI Kitemark or will be rejected by Yorkshire Water Inspector. Where the clear opening of the Kitemarked product is different to that of the cover and frame, a loading bearing slab should be fitted above the cover slab to bring the size down to 600mm x 600mm for the Yorkshire Water specified cover size. Please refer to Concrete Pipe Systems Association (CPSA), 'Technical Bulletin' issued Autumn 2004 for Kitemarked cover slab opening sizes.
- 6. Sulphate resistant cement (**C20-DC2**) and precast concrete products must be used or a laboratory report provided proving that such precautions are not necessary.
- 7. The adoptable sewers should be a minimum of 1m and manholes 0.5m from kerb faces and service margins.
- 8. "Sewers must have 5 metres clearance from trees and hedges (please also refer to the Design and Construction Guidance for restrictions on tree planting adjacent to sewers)".
- 9. Sewers to be laid in Class "S" Bedding (150mm granular bed and surround). Where depth of cover to top of the sewer is less than 1.2m in highways and verges (or less than 900mm in none vehicular access areas) then a concrete slab should be provide above granular bed and surround.
- 10. Bedding and backfill material to conform to the requirement of Water Industry Specification 4-08-02 (**Table A2**).
- 11. The chamber size of manholes with more than one connection in them may need to be increased an increment to accommodate the connections and bends.
- 12. Yorkshire Water policy is not to accept Type "C" brick manholes and 1050mm dia manhole rings. Instead it is preferred that you use a Type "B" manhole with 1200mm dia or 1500mm dia rings, with the opening sited over the channel where depth of cover to pipe soffit is 1 1.5m.
- 13. Adoptable plastic sewer pipes to be BSI Kitemarked (certified to WIS 4-35-01 and BS/EN13476). Adoptable plastic sewer pipes to be laid in maximum 3 metre lengths unless there is a specific operational need to lay longer lengths. Plastic channel sections in manholes are not acceptable and Yorkshire Water would prefer clayware channel in manholes. We have found that plastic channels are difficult to set in concrete because they float and a satisfactory finish cannot be obtained on the benching.
- 14. Where a B125 cover and frame has been approved, this **must not** be coated in plastic and must have lifting eyes suitably sized to accommodate standard lifting keys. Screw down covers are not acceptable.

For all clause and table references please refer to the Design and Construction Guidance contained within the Code for Adoption

Title	Typical Demarcation Chambers
Drawing No	YW-DS-003
Revision	-
Date	April 2020



nction Backdrop Details

Tumbling bay junction (actual details will be Inside face of manhole dependent on the type of pipe used) Straight outlet pipe for 150 mm and 225 mm diameters only. For In-situ concrete to be GEN3 larger diameters, bends are to be (designed to BRE Special Digest built through the manhole wall 1: 'Concrete in Aggressive Ground' 2 No 45° bends 225mm min Backdrop to soffit level diameter. Where pipe exceeds 300mm, a 90° bend may be Concrete surround to backdrop to continue to the base of the manhole **Preferred Backdrop Construction**

Tumbling bay junction Inside face of manhole (actual details will be dependent on the type of pipe used) Straight outlet pipe for 150 mm and 225 mm diameters only. For larger In-situ concrete to be GEN3 diameters, bends are to be built (designed to BRE Special Digest 1: through the manhole wall 'Concrete in Aggressive Ground' 2 No 45° bends 225mm min Backdrop to soffit level diameter. Where pipe exceeds 300mm, a 90° bend may be Concrete surround to backdrop to continue to the base of the Backdrop Option 2

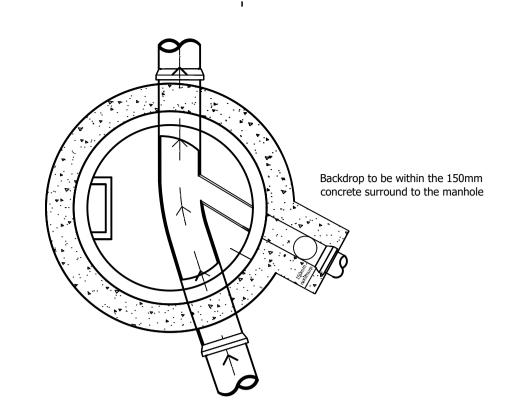
Backdrop Plan View

1220mm x 610mm double twin

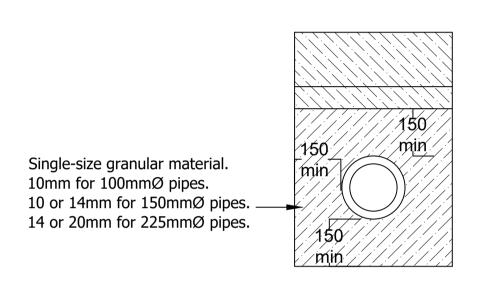
opening directly over the channel

Inverts formed using

clay channel pipes.



Pipe Surround Details



Boxing/sheeting to be removed progressisively during placement of the main backfill above the pipe to prevent displacement of the granular material.

Sidefill material to be place evenly on both sides of the pipe taking care to work material under the lower quadrant of the pipe whilst ensuring the pipe is not lifted. Both sides of the trench should be filled simultaneously to avoid horizontal movement of the pipe

Trench fill under roads to conform with Highways requirements.

2 minimum - 4 courses maximum of

Class B engineering bricks, concrete

blocks or precast concrete cover

Typical detail through Class S Bed and Surround

Road Construction

min

200mm
min

150

200mm
min

150

200mm
1 layer of A393 mesh with 50mm of cover to each face

Single-size granular material.
10mm for 100mmØ pipes.
14 or 20mm for 225mmØ pipes.

Typical detail through Class S Bed and Surround with concrete slab protection (to be used where sewer is less than 1200mm in depth in trafficked areas and less 900mm in un-trafficked areas)

Shallow Manhole Detail

D400 Ductile iron cover & frame to BS. EN 124 with 150mm deep frame in the highway having 1220mm x 610mm Minimum 2, maximum 4 courses of Class B double twin opening directly over the Engineering brick (solid), concrete blocks or Mortar haunching to M.H. cover and precast concrete cover frame seating ring. frame Refer to Clause E6.7. Where manholes are located in highway Heavy duty precast concrete cover slab mortar haunch is to stop 100mm (B.S. 5911) Kite Marked and bedded below cover level with 10th. mortar, proprietary bitumen or resin mastic sealant. High strength concrete topping to be Construction joint brought up to a dense smooth face neatly shaped and finished to all – GEN 3 concrete base. In-situ concrete to be GEN3 (designed to BRE Special Digest 1 Concrete in Agressive Ground)

be brought up to a dense smooth

all branch connections (minimum

thickness 20mm). Gradient to be

1:10 - 1:30

face neatly shaped and finished to

branch connections (min. thickness 20mm). Gradient to be 1:10 - 1:30 Inverts formed using clay channel pipes. Section View Digest 1 Concrete in Agree Ground) 225mm to barrel of pipe Section View High strength concrete topping to

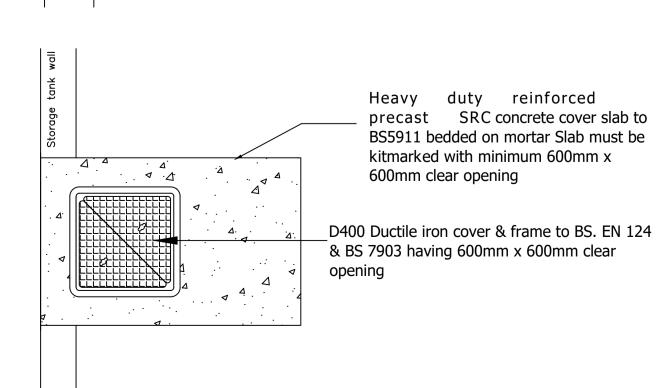
Tank Access Details

Standard Tank Access

D400 Ductile iron cover & frame to BS. EN 124 & BS 7903 having 600mm x 600mm opening with 150mm deep frame in the highway (see clause E2.32) 1:3 cement mortar bed and haunch

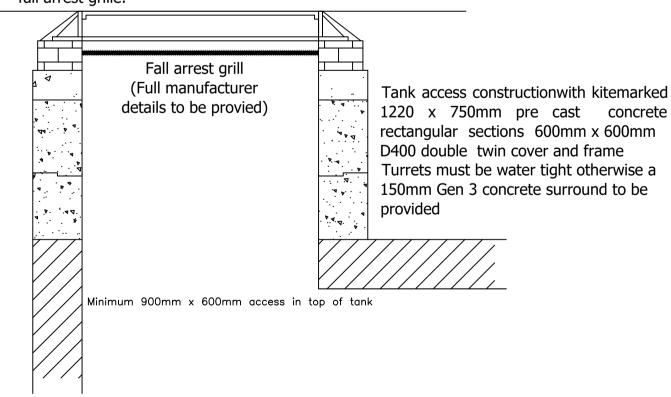
Tank access construction with kitemarked 1220mm x 750mm pre cast concrete rectangular sections with single 600mm x 600mm D400 twin cover and frame.

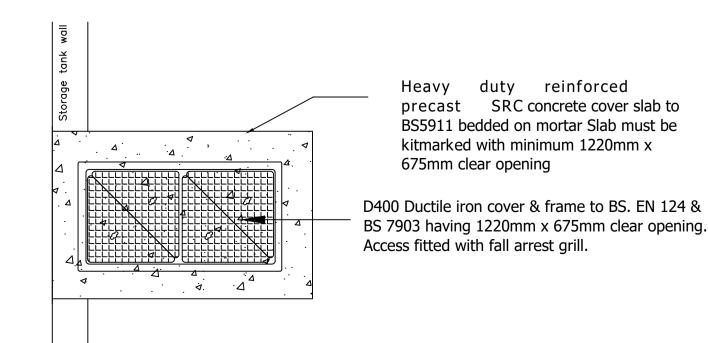
Turrets must be water tight otherwise a 150mm Gen 3 concrete surround to be provided



Access Over Tank Inlet/Outlet Points

D400 Ductile iron cover & frame to BS. EN 124 & BS 7903 having 1220mm x 675mm opening with 150mm deep frame in the highway (see Clause E2.32) 1:3 cement mortar bed and haunch. Access fitted with fall arrest grille.



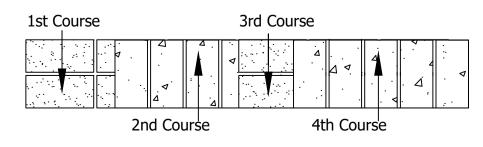


All brickwork to be minimum 2 - maximum 4 courses of Class B engineering bricks constructed in English Bond

Plan View

Brickwork Detail

English Bond



Brickwork Plan View

Yorkshire Water Notes

- All adoptable sewer works and material to be in accordance with the Design and Construction Guidance, The Relevant British/European and Yorkshire Water's Standards/Requirements/Addendum to the Mechanical and Electrical Specification and Kitemarked.
- Manhole covers shall/must have a clear opening of 600mm and shall be Class D400 to BS EN 124 with 150mm deep frames in highways.
- 3. Filled ground must be filled and consolidated under the supervision and to the satisfaction of Yorkshire Water before any sewer works are carried out.
- 4. Yorkshire Water is <u>not</u> obliged to accept filter drain/land drainage run-off into the public sewer network or adoptable drainage system (directly or in-directly). An alternative method of disposal of the land drainage run-off will therefore be required and you will have to liaise with the Local Authority, Land Drainage Section with regard to the disposal of the filter drain/land drainage run-off.
- 5. Cover slabs must carry the BSI Kitemark or will be rejected by Yorkshire Water Inspector. Where the clear opening of the Kitemarked product is different to that of the cover and frame, a loading bearing slab should be fitted above the cover slab to bring the size down to 600mm x 600mm for the Yorkshire Water specified cover size. Please refer to Concrete Pipe Systems Association (CPSA), 'Technical Bulletin' issued Autumn 2004 for Kitemarked cover slab opening sizes.
- 6. Sulphate resistant cement (**C20-DC2**) and precast concrete products must be used or a laboratory report provided proving that such precautions are
- 7. The adoptable sewers should be a minimum of 1m and manholes 0.5m from kerb faces and service margins.
- 8. "Sewers must have 5 metres clearance from trees and hedges (please also refer to the Design and Construction Guidance for restrictions

on tree planting adjacent to sewers)".

- 9. Sewers to be laid in Class "S" Bedding (150mm granular bed and surround). Where depth of cover to top of the sewer is less than 1.2m in highways and verges (or less than 900mm in none vehicular access areas) then a concrete slab should be provide above granular bed and
- 0. Bedding and backfill material to conform to the requirement of Water Industry Specification 4-08-02 (**Table A2**).
- 11. The chamber size of manholes with more than one connection in them may need to be increased an increment to accommodate the connections and bends.
- 12. Yorkshire Water policy is not to accept Type "C" brick manholes and 1050mm dia manhole rings. Instead it is preferred that you use a Type "B" manhole with 1200mm dia or 1500mm dia rings, with the opening sited over the channel where depth of cover to pipe soffit is 1 1.5m.
- 13. Adoptable plastic sewer pipes to be BSI Kitemarked (certified to WIS 4-35-01 and BS/EN13476). Adoptable plastic sewer pipes to be laid in maximum 3 metre lengths unless there is a specific operational need to lay longer lengths. Plastic channel sections in manholes are not acceptable and Yorkshire Water would prefer clayware channel in manholes. We have found that plastic channels are difficult to set in concrete because they float and a satisfactory finish cannot be obtained on the benching.
- 14. Where a B125 cover and frame has been approved, this **must not** be coated in plastic and must have lifting eyes suitably sized to accommodate standard lifting keys. Screw down covers are not acceptable.

For all clause and table references please refer to the Design and Construction Guidance contained within the Code for Adoption

Title		Typical Construction Details
Drawin	g No	YW-DS-004
Revision	on	-
Date		April 2020

