

**Appendix 3 – Report on Draining of a Proposed Commercial Vehicle Wash,
Tir y Berth Depot (1997)**

CAERPHILLY COUNTY BOROUGH COUNCIL

POLLUTION TO RIVER RHYMNEY FROM
COMMERCIAL VEHICLE WASH AT
TIRYBERTH DEPOT

REPORT ON POSSIBLE OPTIONS AS A
SOLUTION TO THE PROBLEM

N. Wilstead
Welsh Water Group

October 1997

INTRODUCTION (see drg. VW-A)

The foul sewer system at Tiryberth Depot is private and drains to a large chamber (Biodisc) adjacent to the River Rhymney at the eastern edge of the depot. Biological action in the Biodisc breaks down the sewage and passes the resultant effluent to the river via a headwall.

The commercial vehicle wash at the depot is connected to a surface water system which drains to the river at a point slightly downstream of the Biodisc. Pollution from the vehicle wash was evident in the river which resulted in the Environment Agency serving an Enforcement Order on CCBC requiring a curtailment of the use of the vehicle washing facility until the quality of discharge is acceptable or a solution is achieved to remove the source of the pollution.

This report provides details of possible solutions, together with estimated costs.

Some options may be of a temporary nature, whilst others will be a permanent option. The reason for compiling both is that Welsh Water is about to upgrade the Trunk Sewer in the area, but it is uncertain at the moment of the exact location of the new sewer.

Options Available

1. Installation of water recycling plant at the site of the existing vehicle wash.
2. Construction of a storage tank in the vicinity of the vehicle wash emptied as required by mobile tanker.
3. Construction of a new pumping station at the River Rhymney with a rising main above river level connecting to the Trunk Sewer.
4. Construction of a new gravity sewer connecting to a suitable public sewer at Grey Crescent, Tiryberth.

Option 1

Water Recycling Plant at Vehicle Wash (see drg. VW-1)

This option includes for the introduction of a water recycling plant at or near the existing vehicle wash.

The principle of the plant is to recycle the contaminated water for re-use with a facility for collecting debris from the cleansing operation. This silt and other substances are collected in a fine gauge cage for removal and subsequent disposal.

There are several benefits to this option.

1. Minimal infusion of water into the system since all water is recycled.
2. Low maintenance costs. Disposal of accumulated debris would not be on a frequent basis.
3. All construction work limited to one area.

This option only allows for treatment of the flow from the vehicle wash. The foul sewer serving the Depot would still drain to the 'Biodisc' which will continue to incur maintenance costs.

Estimated Costs

Supply of recycling plant	£
Civils works associated with installation	20,000
Staff costs/professional fees	5,000
Total estimate	<u>3,000</u>
	<u>28,000</u>

Running costs provided by a local supplier of a recycling plant approximate to less than 20 pence per single cleansing operation.

Annual running costs based on information received from CCBC's Transport Section would amount to less than £1000.

Summary

Capital costs	£
Revenue costs (annual)	28,000
	1,000

NOTE: Should this option be favoured and a new Trunk Sewer is favourably located in six years time, it would be cost effective at that time to abandon the recycling plant and invest a further £8,000 which would ensure a direct connection from the vehicle wash to the Trunk Sewer via the existing foul sewer system.

Option 2

Storage Tank at Existing Vehicle Wash (see drg. VW-2)

This solution allows for a storage tank of suitable capacity to be constructed near the wash which will allow all waste flow from the wash to drain under gravity to the tank. The tank will be required to be emptied by a mobile tanker or gully emptying machine at suitable intervals depending on the usage of the wash.

It is anticipated that each vehicle to be washed produces 20 gallons of waste and that a maximum of 5 vehicles can be catered for in one day. This requires 100 gallons to be stored in one day. Approximate storage capacity per 5 day week is 500 gallons.

A tank of double this capacity could easily be accommodated adjacent to the existing wash.

Estimated Costs

Supply of storage tank including civils works (constructed in glass reinforced plastic)	£ 10,000
Staff costs/professional fees	<u>1,500</u>
Total estimate	<u>11,500</u>

The estimate of £11,500 is the capital cost of this option.

It is anticipated that a 1100 gallon tanker would be used once a week at a cost of £70 per emptying operation.

Therefore, annual revenue costs approximate to £3,500 per year.

Summary

Capital costs	£ 11,500
Revenue costs (annual)	3,500

NOTE:

Should this option be favoured and a new Trunk Sewer is favourably located in six years time, it would be cost effective at that time to abandon the storage tank and invest a further £8,000 which would ensure a direct connection from the vehicle wash to the Trunk Sewer via the existing foul sewer system.

Option 3

Pumping Station and Rising Main (at River Rhymney) (see drg. VW-3)

This solution involves the construction of a pumping station and rising main across the River Rhymney to a new manhole constructed on the Trunk Sewer (MH4).

The discharge from the vehicle wash as it currently exists would drain to the foul sewer serving the depot at MH1. This now combined flow would by-pass the existing 'Biodisc' and drain direct to the pumping station. With this solution the 'Biodisc' would become obsolete.

Dwr Cymru Welsh Water have programmed a renewal of the Trunk Sewer in this vicinity, but it may not be for several years. It is also uncertain which side of the river the new sewer will be located.

Should this solution be adopted the short term capital costs would be considerable. Maintenance costs associated with the pumping station approximate to £2000. This revenue cost could be eliminated when the new Trunk Sewer is installed, but only if it is constructed on the Depot side of the river.

Estimated Costs

Pumping station (including mechanical & electrical work)	£ 30,000
Ancillary sewer (150mm ø) including rising main	7,000
Manholes	10,000
Staff costs/professional fees	<u>10,000</u>
Total:	<u>57,000</u>

Summary

Capital costs	£ 57,000
Revenue costs (annual)	2,000

Option 4

This option comprises a new sewer from the vehicle wash through the depot along a suitable route to a public foul sewer at the rear of Greys Crescent.

A detailed investigative survey has not been carried out, but the route while possible would entail works in private land (allotment gardens) which may involve compensation. Within the depot there would be areas in which pipelaying would be difficult, maybe requiring a retaining wall to be constructed. Considerable disturbance to the normal day to day operation of the depot would be inevitable.

Whilst this option would require minimal revenue costs, the existing 'Biodisc' would have to be retained to serve the lower area of the depot.

Estimated Costs

225mm dia. sewer (280 metres)	£
Manholes	28,000
Retaining Wall	7,000
	<u>15,000</u>
	50,000

No costs relating to compensation to private landowners is included.

Staff costs/professional fees (including supervision)	£
	10,000
	<hr/>
Total:	<u>60,000</u>

Summary

Capital costs	£
Revenue costs (annual)	60,000
	200

SUMMARY OF COSTS FOR NEXT 6 YEAR PERIOD

Option 1	Capital Costs (£k)	Staff Costs/Fees (£k)	Annual Maint. (£k)	Net Present Value (£k)	Comments
*1	25.0	3.0	1.0	34.0	Water Recycling Plant
*2	10.0	1.5	3.5	32.5	Storage Tank
3	47.0	10.0	2.0	69.0	Pumping Station
4	50.0	10.0	0.2	61.2	Gravity sewer through depot to a suitable existing sewer

* Options 1 and 2

NPV for both options includes the capital costs and the maintenance costs for the six year period.

The extra capital works involved in connecting the vehicle wash to the new Trunk Sewer (if located on the Depot side) and thus eliminating maintenance costs of tank emptying would be approximately £8,000.

SUMMARY

Dwr Cymru Welsh Water intend to renew the Trunk Sewer in this area, which is currently on the Fleur-de-Lys side of the river, within the next six years. It is uncertain which side of the river the new sewer will be laid.

The location of this new sewer plays an important role in recommending the most cost effective solution to the problem.

The least cost effective and the most disruptive solution would be the construction of a gravity sewer through the depot to a suitable public sewer. Although maintenance costs would be low, the capital cost of £60,000 makes Option 4 the most expensive solution, whilst still having to retain the 'Biodisc'.

Almost as expensive, but less disruptive, is Option 3 which involves the construction of a new pumping station and rising main connecting to the existing Trunk Sewer in Fleur-de-Lys. Whilst the capital costs are marginally lower at £57,000, the revenue costs are higher at £2000 per year. This proposal, however, would mean that the 'Biodisc' would not be required. There could possibly be a revenue saving in this instance.

The construction of a water recycling plant near the existing wash is one of two favoured solutions. With a capital cost of £28,000 and an annual maintenance cost of £1000, Option 1 is very cost effective. Equally as cost effective is Option 2 which is a storage tank situated near the wash, to be emptied probably on a weekly basis. The capital cost of £11,500 is the lowest while the annual maintenance cost of £3,500 is the highest of the options. Both these solutions would cause the least disruption, but as with Option 3 the 'Biodisc' would need to be retained.

In the six years prior to the new Trunk Sewer being constructed there is little to choose between the recycling plant or the storage tank options. Both will have a combined capital and revenue expenditure over this period of £34,000 and £32,500 respectively.

However, after this six year period the storage tank option would have the more expensive revenue costs should the decision be made to site the new Trunk Sewer on the Fleur-de-Lys side. In this instance, the recycling plant would be more cost effective.

Therefore, the recommendation is to utilise a water recycling plant whilst retaining the 'Biodisc' for the foul flow from the Depot. Should the new Trunk Sewer be favourably located, it would be recommended to abandon the recycling plant and connect the vehicle wash to the existing foul sewer which could also be connected directly to the new Trunk Sewer. The additional capital costs amount to approximately £8,000.

Written by: *N. Wilstead*

Checked by: *J. M. Dyer*

Approved by: *[Signature]*

Tir y berth vehicle wash storage tank

Tir y berth depot.

Welsh Water Group
February 1998

TIRYBERTH DEPOT

VEHICLE WASH STORAGE

1. Bill of Quantities.
2. Manufacturer's Installation Guide.

1. Bill of Quantities

	Item	Description	Quantity	Unit	Rate	£	
		<u>PROVISIONAL SUMS</u> <u>DAYWORK - LABOUR</u> Note: The Tenderer's attention is drawn to Section C - Daywork Schedule of Rates to be fixed by the Tenderer to include all provisions authorised by the Federation of Civil Engineering Contractors under the heading "Labour" in their "Schedule of Daywork incidental to Contract Work" (i.e. rates to include 'net amount of wages' plus 'percentage additional' plus 'subsistence and periodic travel allowance')					
	A411.1	Ganger	10	hrs.			
	A411.2	Labourer	10	hrs.			
	A411.3	JCB Type Excavator-Driver	10	hrs.			
C/F to Part Summary							

	Item	Description	Quantity	Unit	Rate	£	
	A421.1	<p><u>CLASS A - GENERAL ITEMS</u></p> <p><u>Provisional Sums</u></p> <p>Supply of GRP storage tank. Supplier: Cambrian Plastics Ltd., Litchard Industrial Estate, Bridgend, S. Wales. Tel.: 01656-657482 Fax: 01656-767127</p> <p>Tank = 9000 litre capacity Dimensions = 4.16m long 1.83m dia. Turret 0.6m long</p> <p>Total cost inclusive of delivery = £1383 Delivery 1/2 weeks. Contractor to include for any administration costs deemed necessary in fulfilling ordering and delivery to site. The Contractor is wholly responsible for the tank, its delivery, handling and installation. A copy of the supplier's installation procedure is attached.</p> <p>The Contractor has the opportunity to include, as a percentage of the above sum, any costs related to administration involved in the supply of the item.</p> <p><u>Work within Tiryberth Depot</u></p> <p>The Contractor is advised that the work will be carried out in a busy commercial depot where a constant flow of commercial vehicles will be experienced which may hinder progress of the works. The Contractor may allow for the possibility of this situation within the rates generally within the Bill of Quantities.</p>	Sum			1383	00
				%			

Carried to Grand Summary

PART SUMMARY
CLASS A - GENERAL ITEMS

£ **p**

Page 1

Page 2

Total for Class A carried to Grand Summary

Item	Description	Quantity	Unit	Rate	£	
	<u>CLASS B - GROUND INVESTIGATION</u> <u>Trial Pits and Trenches</u>					
B111.1	Number in material other than rock, max. depth not exceeding 1m.	2	Nr			
B130.1	Depth in material other than rock.	1	m			
B150.1	Depth supported.	1	m			
B160.1	Depth backfilled with GSB Type 1 max. depth 900mm. Reinstatement to be 40mm thick wearing course - 10mm size aggregate dense bitumen macadam and 60mm thick base course - 14mm size aggregate dense bitumen macadam. Breaking up existing flexible surface 100mm thick to be included in this item.	1	m			
	<u>Note:</u> Base plan area to be minimum 1m x 1m and all excavation is to be carried out <u>BY HAND</u> .					
Carried to Part Summary						

PART SUMMARY
CLASS B - GROUND INVESTIGATION

Page 4

£ p

Total for Class B carried to Grand Summary

	Item	Description	Quantity	Unit	Rate	£	
		<u>CLASS E - EARTHWORKS</u> <u>General Excavation</u> <u>Area of Excavation 4.6m x 2.5m</u>					
	E425.1	Material other than topsoil, rock or artificial hard material, maximum depth 0.2 - 0.5m. Anticipated material is overburden with a thickness of approximately 0.5m. All excavated material to be disposed of to licensed tips off site.	5.8	m ³			
	E435.1	Rock, anticipated depth 2.8m. Maximum depth 2 - 5m. All excavated material to be disposed of to licensed tips off site.	32	m ³			
Carried to Part Summary							

PART SUMMARY
CLASS E - EARTHWORKS

£

p

Page 6

Total for Class E carried to Grand Summary

	Item	Description	Quantity	Unit	Rate	£	
		<u>CLASS F - IN SITU CONCRETE</u> <u>Provision of concrete</u>					
	F221.1	Designed mix Grade C20, cement to BS.12 or BS.146, 10mm aggregate. Base to storage tank 150mm thick.	1.7	m ³			
		<u>Placing of concrete</u>					
	F621.1	Reinforced, bases, footings, pile caps and ground slabs. Thickness not exceeding 150mm. Base to storage tank 150mm thick. This item is to include for the installation of the 'holding down' lug within the base as shown in the detail on Drg. No. 1a.	1.7	m ³			
Carried to Part Summary							

PART SUMMARY
CLASS F - IN SITU CONCRETE

£ p

Page 8

Total for Class F carried to Grand Summary

	Item	Description	Quantity	Unit	Rate	£	
		<u>CLASS G - CONCRETE</u> <u>ANCILLARIES</u>					
	G563.1	Reinforcement, Steel fabric to BS.4483, nominal mass : 3-4 kg/m². Structural mesh to BS.4483 type B196.	12	m²			
	G811.1	Concrete accessories, finishing of top surfaces, wood float, surface to concrete reinstatement to 150Ø pipe at kiosk	3	m²			
Carried to Part Summary							

PART SUMMARY
CLASS G - CONCRETE ANCILLARIES

Page 10

£ p

Total for Class G carried to Grand Summary

	Item	Description	Quantity	Unit	Rate	£	
	1512.1	<u>CLASS 1 : PIPEWORK - PIPES</u> Polyvinyl chloride pipes to BS.4660 or BS.5481. UPVC pipes 150mm dia. in trenches, depth : not exceeding 1.5m. Between storage tank and proposed catchpit in concrete/tarmac and between tank and proposed gully in tarmac.	6.5	m			
Carried to Part Summary							

PART SUMMARY
CLASS I - PIPEWORK - PIPES

Page 12

£

p

Total for Class I carried to Grand Summary

	Item	Description	Quantity	Unit	Rate	£	
	J481.1	<u>CLASS J - PIPEWORK - FITTINGS AND VALVES</u> Polyvinyl chloride pipes to BS.4660 or BS.5481. UPVC straight specials 600mm long as stub pipe (out of chambers and storage tank) and rocker pipes. Nominal bore: not exceeding 200mm. Diameter 150mm.	8	Nr.			
Carried to Part Summary							

PART SUMMARY
CLASS J - PIPEWORK - FITTINGS

£ p

Page 14

Total for Class J carried to Grand Summary

Item	Description	Quantity	Unit	Rate	£
	<u>CLASS K : PIPEWORK - MANHOLES AND PIPEWORK ANCILLARIES</u>				
K211.1	Other stated chambers; brick, depth : not exceeding 1.5m. Proposed catchpit 600 x 500 (internal dims.) constructed on 'live' 150mm drain from vehicle wash. Estimated max. flow 2 litres/second. To include for Grade A cover and frame 600 x 500 and Grade C20 concrete base 225mm thick.	1	Nr.		
K211.2	Other stated chambers, brick, depth : not exceeding 1.5m. Proposed brickwork gully 400 x 345 (internal dims.) located in tarmac area. To include for Grade A grid and frame 400 x 345 and Grade C20 concrete base 225mm thick.	1	Nr.		
K791.1	Breaking up and permanent reinstatement of concrete access to existing kiosk. Existing concrete deemed to be reinforced with structural mesh with a total thickness of 150mm. To include for reinstatement of Grade C20 concrete with B196 structural mesh in top of concrete with 50mm of cover. Width of reinstatement 700mm.	2.5	m		
K791.2	Breaking up and permanent reinstatement of tarmac surface in depot anticipated to be 100mm thick. Reinstatement to be as shown on Drg. No. 1a. Note: this item is not measured strictly in accordance with CESMM 3 in that the measurement is per square metre and not a linear metre.	12.5	m ²		
Carried to Part Summary					

	Item	Description	Quantity	Unit	Rate	£	
		<u>CLASS K (Cont'd)</u>					
	K861.1	Connections to existing pipes, ducts and culverts. 2 No. 150 Ø UPVC pipes to turret of tank. See "Notes - Pipework" on drawing No. 1a.	2	Nr.			
	K861.2	<u>Repairs to existing fuel interceptor chamber</u> Existing overall structure consists of 3 No. individual chambers. Chambers A and B have defective pipework rendering them unsuitable for the intended purpose. This item to include for partial demolition of each chamber (A and B) of 225 thick brick down to water level (0.8m from ground level) in order to renew 150mm Ø pipe bends in A and B. Each chamber 0.45m x 0.45m with Grade A cover and frame. To include for dealing with flows which will arise as a result of surface water drainage from an area within the depot.		Item			
	K999.2	Surface water interception to proposed gully. This consists of a constructed 'hump' to divert surface water from the wash down area to the proposed gully. Constructed from wearing course material as shown in detail on Drawing No. 1a. Any joints to be suitably sealed.	12	m			
Carried to Part Summary							

PART SUMMARY
CLASS K - PIPEWORK - MANHOLES

£ p

Page 16

Page 17

Total for Class K carried to Grand Summary

	Item	Description	Quantity	Unit	Rate	£	
		<u>CLASS L : PIPEWORK - SUPPORTS AND PROTECTION</u>					
	L126.1	Extras to excavation and backfilling, in manholes and other chambers backfilling around and beneath the tank with Pea Gravel naturally rounded stone between 3 and 20mm.	33	m³			
	L341.1	Grade C20 concrete bed and surround to 150 Ø UPVC pipes. Concrete 150mm thick around pipe and to include for 'Flexcell' or equivalent flexible interruption in concrete at every pipe joint.	6.5	m			
	L126.1	Extras to excavation and backfilling in manholes and other chambers, backfilling above Pea Gravel with GSB Type 1.	6.3	m³			
Carried to Part Summary							

PART SUMMARY
CLASS L - PIPEWORK - SUPPORTS

Page 19

£ p

Total for Class L carried to Grand Summary

TIRYBERTH DEPOT, VEHICLE WASH STORAGE

GRAND SUMMARY

CLASS A

CLASS B

CLASS E

CLASS F

CLASS G

CLASS I

CLASS J

CLASS K

CLASS L

GRAND TOTAL: _____

Name of Contractor: _____

Address: _____

Signed: _____

Dated: _____

2. Manufacturer's Installation Details

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CAMPLAS TECHNOLOGY INSTALLATION GUIDE

CAMPLAS UNDERGROUND TANKS

TANK CAPABILITY

CAMPLAS Tanks can be installed either in granular backfill or a concrete surround using the relevant details as attached, the installation is designed for where the top of the tank is no deeper than 1 metre below ground level and where the water table does not at any time rise above the top of the tank.

FOR ANY INSTALLATION OUTSIDE THESE PARAMETERS PLEASE CONTACT:

CAMPLAS TECHNOLOGY LIMITED (01656) 657483.

DELIVERY

Tanks will be delivered to the nearest hard standing, and the contractor is responsible for the offloading, using LIFTING STRAPS and NOT CHAINS OR WIRE ROPES.

Cure should be taken to prevent any damage to the tank.

THE FOLLOWING INSTALLATION ADVICE IS OFFERED AS A GUIDE ONLY. CAMPLAS TECHNOLOGY LIMITED DO NOT ACCEPT ANY RESPONSIBILITY FOR THE THICKNESS OR STRENGTH OF THE CONCRETE SURROUND OR GRANULAR BACKFILL. THIS MUST BE DETERMINED BY THE ENGINEER, TAKING INTO ACCOUNT THE PREVAILING SITE CONDITIONS, POSSIBILITIES OF IMPOSED LOADS, BUOYANCY, ETC.

INSTALLATION USING GRAVEL SURROUND

All installation procedures should be conducted observing the general requirements of the Health & Safety at Work Act and specifically the Construction Regulations. During the installation procedure, the following will be required on site:

1. Qualified supervision.
2. Normal construction plant and equipment.
3. A sufficient quantity of Pea Gravel - naturally rounded stone between 3 and 20mm in size or gravel crushings between 3 and 12mm in size. THE SIZE AND TYPE OF MATERIAL IS IMPORTANT.
4. Waterproof sealant to be used in assembling the access turret (where supplied).
5. Pumping equipment where necessary to ensure the excavation is kept totally dry.
6. Concrete to provide reinforced base (optional for wet ground).
7. B1131 reinforcing mesh.

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INSTALLATION PROCEDURE

1. Mark out and excavate the tank dimensions, allowing an extra 450mm to all side and base unit. Make certain the base of the excavation is level.
2. Before proceeding further, make certain that provision has been made to ensure that the excavation is kept dry throughout the installation.
3. Lay the required number of tank retaining straps (where required) into the base of the excavation in position as indicated. Make certain free ends are accessible.
4. Lay 150mm concrete base, reinforced with one layer of B1131 reinforcing mesh, ensuring that the retaining straps are in such a position that they will rise vertically to the tank sides (when in position).
5. After the base of the slab has been allowed to set in, lay a 300mm layer of Pea Gravel, and lower the tank gently onto it. Check for alignment or pipework and invert levels. If adjustment is necessary remove the tank from excavation, and make alterations, always ensuring a minimum flat bed of 300mm. When complete replace tank in position.
6. Place second part of retaining strap over the top of the tank, and connect to first part already installed excavation. When placed correctly, commence tightening the straps using the ratchet. BY HAND ONLY.
7. Place temporary covers over all remaining tank openings, having made all necessary pipework connections.
8. Lay a second 300mm layer of Pea Gravel evenly around the tank ensuring that it is worked under the tank that all voids are filled with Pea Gravel and compacted evenly. Extra care should be taken between ribs, under end, etc.
9. Lay a further 300mm layer of Pea Gravel as described above.
10. Connect up inlet, outlet and vent pipes (where fitted) and then backfill to top of tanks with Pea Gravel. Note: Check the site plans to determine the ventilation point to avoid smells/fumes, etc.
11. Place access turret (where supplied) on tank after first ensuring that all surfaces are clean and dry and liberally applying waterproof mastic to the mating surfaces. Make the joint.
12. All pipework, access turret etc. must be free to move with the tank and should not be inside the area of the excavation.
13. Continue to place Pea Gravel to ground level (or under-side of road/traffic slab where installed).

NOTE

When installed in a traffic area, it may be necessary to design a reinforced cover slab to prevent that tank being subjected to imposed loads. In areas where a high water tables are a problem, it may be necessary to design a weighted slab to prevent flotation.

Should further advice be required, please telephone Camplas Technology Limited on (01656) 657483.

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N.B. Excavation /backfill must not be greater than 600mm all round tank. If this is the case then sheet piles must be used to prevent excess pressure on the tank.

Alternatively refer to concrete installation guide.

INSTALLATION USING CONCRETE SURROUND

All installation procedures should be conducted observing the general requirements of the Health & Safety at Work Act and specifically the Construction Regulations.

During the installation procedure, the following will be required on site:

1. Qualified supervision.
2. Normal construction plant and equipment.
3. Concrete to 20 Newton/mm/sq. with 30-50mm slump.
4. Waterproof sealant to be used in assembling the access turret (where supplied).
5. An adequate supply of water capable of keeping pace with the rate of concrete backfilling.
6. Pumping equipment where necessary, to ensure excavation is kept totally dry.

INSTALLATION PROCEDURE

1. Mark out, and excavate to the tank dimensions, allowing an extra 230mm to all sides and base, for the concrete surround. Make certain the base of excavation is level.
2. Before pouring concrete, make certain that provision has been made to ensure excavation is kept dry throughout installation, and until the concrete surround has cured.
3. Pour the concrete base to a minimum of 230mm and level.
4. Lower the tank carefully into the wet concrete checking alignment of pipework and invert levels.
5. Place temporary covers over all tank apertures.
6. Commence backfilling the excavation with concrete, whilst AT THE SAME TIME, charging the tank with water at such a rate, that the levels of the water and concrete remain equal. Ensure that the concrete is evenly distributed around that tank at all times.
7. Ensure that the concrete is worked around the tank to prevent voids.
8. Make all pipework connections.
9. Place access turrets (where supplied loose) after ensuring that joint area is clean and dry, and liberally waterproof mastic to the mating surfaces. Make joint.

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10. Continue placing of concrete until a minimum cover of 230mm is achieved over the top of the tank.
11. Access shafts (where supplied) should be surrounded in a minimum of 230mm of concrete placed in 1m lifts.
12. Backfill to ground level, and install suitable manhole cover and frame over all access turrets.
13. When concrete is fully cured Separators should be left full of clean water.

NOTE

(1)

When installed in a traffic area, it may be necessary to design a reinforced cover slab to prevent the tank being subjected to imposed loads. In areas where very high water tables are a problem, it may be necessary to design a weighted slab to prevent flotation.

(2)

Greasetraps, Treatment Plants and Multi Chamber Interceptors

82mm dia uPVC ventilation sockets are provided on each manway turret. These are intended to allow the compartments to 'breathe' and to allow fumes and smells to escape. If these are not required for ventilation purpose (i.e. ventilation provided elsewhere in the system) they must be linked together to allow the fumes to pass between compartments.

**CAERPHILLY COUNTY BOROUGH COUNCIL
CYNGOR BWRDEISTREF SIROL CAERFFILI**

INTERNAL MEMO

To: Chief Internal Auditor

My Ref: EWW/111/NW/SAW

From: Welsh Water Group Manager

Your Ref:

Please Reply To: Neil Wilstead

Date: 1999

Tel. Ext.: 4230

VEHICLE WASH STORAGE TANK, TIRYBERTH

FINAL ACCOUNT

PLEASE FIND ATTACHED THE FINAL ACCOUNT FOR THE ABOVE SCHEME FOR AUDIT PURPOSES.

NWilstead

FOR CHIEF ENGINEER

Att....

Caerphilly County Borough Council.
DSO.,
Penmaen Depot,
BLACKWOOD.

Mr. N. Wilstead
(01443) 864230

EWV/111/NW/SAW
26 October 1999

Dear Sir,

VEHICLE WASH STORAGE TANK, TIRYBERTH
SUBSTANTIAL COMPLETION VALUATION CERTIFICATE

I acknowledge receipt of your Valuation No. 1 dated 2nd October, 1998 in respect of the above works, which after adjustment certifies the sum of £7,478.97 exclusive of VAT as due for payment.

A copy of the substantial completion certificate and valuation is appended for your information and records.

Please forward to me an internal invoice for the amount certified in order that I can arrange payment of the monies due.

I certify that in accordance with Clause 48 of the Conditions of Contract the above Contract was substantially completed on 21st April, 1998 and that the defects correction period commenced from that date.

Yours faithfully,



for CHIEF ENGINEER

Enc...

QA-EWV-18/5

REV.O. OCTOBER 1998