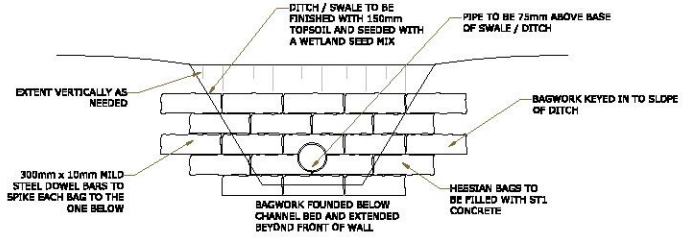
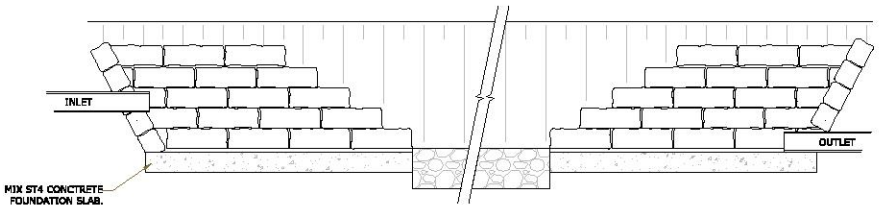


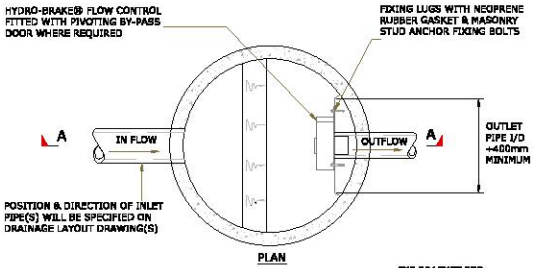
INLET/OUTLET BAGWORK HEAD WALL DETAIL

1:20

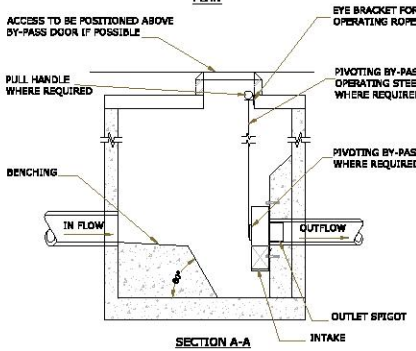


INLET/OUTLET BAGWORK HEAD WALL DETAIL

1:20



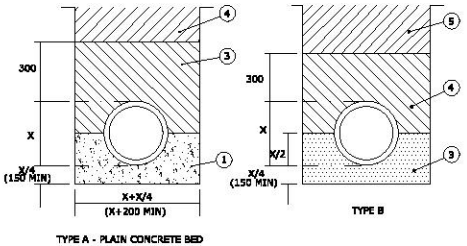
PLAN



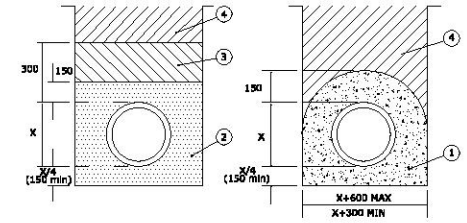
SECTION A-A

TYPICAL HYDRO-BRAKE® DETAIL- TYPE SXH

SUBJECT TO MANUFACTURERS DESIGN QUOTATION (HYDRO-INTERNATIONAL)
NOT TO SCALE, DIMENSIONS IN MILLIMETRES

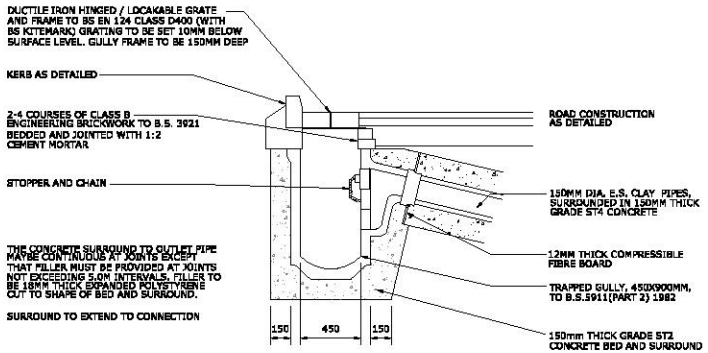


TYPE A - PLAIN CONCRETE BED
BF 2.6

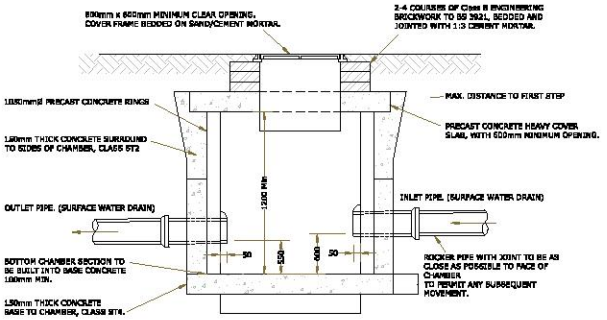


TYPE S - GRANULAR BED AND SURROUND
BF 2.5

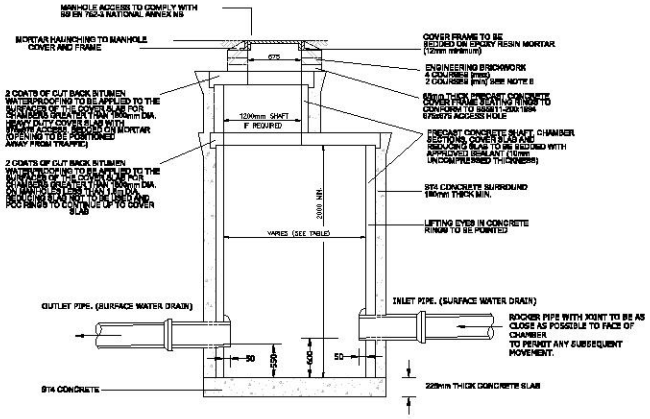
TYPE Z - CONCRETE BED AND SURROUND
BF 4.5



ROAD GULLY DETAIL
(SCALE 1:10)



TYPICAL CATCHPIT DETAILS
(DEPTH TO BASE 1.2 TO 3.0m MAX)
(SCALE 1:20)



TYPICAL CATCHPIT DETAILS
(DEPTH TO BASE > 3.0m)
(NOT TO SCALE)

1. CONCRETE MIX ST4
2. PIPE BEDDING MATERIAL TO CLAUSE 503.3(I) OF THE SPECIFICATION EVENLY COMPACTED.
3. CLASS B LOWER TRENCH FILL TO CLAUSE 503.3(IV) OF THE SPECIFICATION COMPACTED BY HAND.
4. ACCEPTABLE MATERIAL (CLASS 1: GRANULAR MATERIAL, 2: COHESIVE MATERIAL OR 3: CHALK) COMPACTED TO CLAUSE 505 OF THE SPECIFICATION (I.E. IN LAYERS OF 225MM THICK MAXIMUM) UNLESS SPECIFIED OTHERWISE.
5. ACCEPTABLE MATERIAL (CLASS 1, 2 OR 3) COMPACTED TO CLAUSE 505 OF THE SPECIFICATION UNLESS SPECIFIED OTHERWISE.

NOTES

A. ALL DIMENSIONS ARE IN MILLIMETRES.
B. DIMENSION X IS THE EXTERNAL DIAMETER OF THE PIPE.
C. FOR TYPE Z TRENCH THE CONCRETE COVER MAY BE FORMED TO A RADIUS, BATTER OR HORIZONTAL SURFACE. MINIMUM COVER OF CONCRETE SHALL BE 150MM.
D. FOR TRENCH TYPES A AND Z FLEXIBLE CONSTRUCTION JOINTS ARE TO BE FORMED IN THE CONCRETE TO COINCIDE WITH EACH PIPE JOINT WITH PREFORMED JOINT FILLER TO CLAUSE 1015 OF THE SPECIFICATION. THICKNESS OF FILLER BOARD TO BE 25MM.
E. THE MINIMUM AND MAXIMUM TRENCH WIDTHS ARE AS FOLLOWS:
MINIMUM = X + 300
MAXIMUM = X + 600

FOR MEASUREMENT PURPOSES THE VOLUMES OF HARD BREAKOUT OR IMPORTED BACKFILL TO TRENCHES SHALL BE CALCULATED USING THE MEAN OF THE MINIMUM AND MAXIMUM TRENCH WIDTHS.

TRENCH AND BEDDING DETAILS, SEWERS AND DRAINS

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS, ARCHITECTS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.
2. DO NOT SCALE FROM THIS DRAWING MANUALLY OR ELECTRONICALLY. WRITTEN PERMISSION MUST BE OBTAINED FROM MLM PRIOR TO SCALING ELECTRONICALLY OR USING THIS ELECTRONIC FILE.

CONSTRUCTION (DESIGN AND MANAGEMENT) REGULATIONS 2015

DESIGNERS HAZARD INFORMATION FOR CONSTRUCTION

1. IF YOU DO NOT FULLY UNDERSTAND THE RISKS INVOLVED DURING THE CONSTRUCTION OF THE ITEMS INDICATED ON THIS DRAWING ASK YOUR MANAGER, HEALTH & SAFETY ADVISOR OR A MEMBER OF THE DESIGN TEAM BEFORE PROCEEDING.
2. EXISTING SERVICES MAY BE PRESENT.
3. WORKING ADJACENT TO AIRPORT.
4. REFER TO UXO REPORT FOR RISKS ASSOCIATED WITH UXO

THE ABOVE NOTES REFER SPECIFICALLY TO THE INFORMATION SHOWN ON THIS DRAWING.

REFER TO THE HEALTH AND SAFETY PLAN FOR FURTHER INFORMATION.

REV	DATE	REVISION	MADE	CHK	APP
C9	29.07.2020	UPDATED TO AS BUILT BASED ON INFORMATION SUPPLIED BY READIE CONSTRUCTION	TC	TC	TC
C4	01.08.19	CHAMBER DIAMETER TABLE REMOVED	DK	DS	DS
C3	22.07.19	UPDATED CATCHPIT DETAIL	AL	DK	DK
C2	19.07.19	ADDED CATCHPIT DETAILS >3m	AL	DK	DK
C1	14.06.19	UPDATED TO CONSTRUCTION	DR	DK	DK
T1	24.09.18	FIRST ISSUE	DK	AL	AL

DRAWING STATUS: AS BUILT

SUITABILITY DESCRIPTION: SUITABLE FOR INFORMATION

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Tel: 01233 810530
Website: www.mlmgroup.com

CLIENT: readie

PROJECT: AIRPORT BUSINESS PARK SOUTHEND

DRAWING TITLE: PHASE 2 INFRASTRUCTURE SURFACE WATER DRAINAGE CONSTRUCTION DETAILS SHEET 1

DRAWN/DESIGN	CK	MLM REF	STATUS	REVISION
SCALE 1:NTS @A1		582093	S2	C5

PROJECT	ORIGINATOR	VOLUME/ SYSTEM	LEVELS & LOCATIONS	TYPE	ROLE	NUMBER
582093	MLM	P2	XX	DR	C	0017

PRINT ACCURACY INDICATOR 50mm 100mm

Appendix C - Flow Control Details

Hydro-Brake® Optimum

The Hydro-Brake® Optimum is Hydro International's flagship passive flow control device and the most advanced vortex flow control available.

Hydro-Brake® Optimum is the only vortex flow control for which the head and discharge relationship can be fine-tuned to optimise your design. Designers can size a Hydro-Brake® Optimum to achieve the perfect hydraulic performance curve and engineer the best possible passive flow control performance.

Surface water management and SuDS

Combined drainage systems and CSOs

Watercourse flood prevention

Sewer network optimisation

Wastewater treatment plants

- ✓ No external energy source.
- ✓ No moving parts.
- ✓ Future-proof.
- ✓ Large outlet clearances prevent blockages.

There is No Equivalent

Hydro-Brake® Optimum dispenses with the need to choose from a range of sizes and types and instead offers built-in flexibility to size each unit for absolute fit. Each Hydro-Brake Optimum® is individually-sized, so you achieve performance without compromise for every project.

Maximise Storage Savings

The increased hydraulic efficiency of the Hydro-Brake® Optimum means you can reduce on-site storage by up to 15% than if an alternative vortex control is used. With reduced storage, you can lower construction and excavation costs as well as saving project time and overall land-use.

Best Value for Every Project

Selecting the superior performance of Hydro-Brake® Optimum does not mean a higher cost for your project. On the contrary, because your upstream storage can be fine-tuned to achieve the smallest volumes, construction, excavation and material costs are reduced.

Easy to Install

Hydro-Brake® Optimum comes with a range of installation options and accessories to make construction and installation as simple as possible.

Setting the Standard

The Hydro-Brake® Optimum is the culmination of more than 35 years of research and development by Hydro International, and the company continues to take an international lead in vortex technology and expertise. Hydro-Brake® Optimum is the only vortex flow control to be independently certified by BBA and WRc.

BBA APPROVAL INSPECTION TESTING CERTIFICATION

wrc approved PT/409/0417

Minimal Maintenance

With up to 20% larger outlet clearances compared to other vortex devices, there is significantly less risk of blockage with a Hydro-Brake® Optimum. With no power source or moving parts, it offers minimal, predictable maintenance.

Future-Proofed

Hydro-Brake® Optimum can be supplied with an adjustable inlet so flows can be altered by up to 40% post-installation, to allow for future changes in operating conditions, for example as a result of site expansion or climate change.

Flow Control Chamber

A Hydro-Brake® Optimum flow control can be supplied prefitted in a precast reinforced concrete chamber. Custom options including high level emergency bypass, rodding pipe and removable units are also available.

Appendix D - Storage Crate Details

TABLE 23.1 Operation and maintenance requirements for ponds and wetlands

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter and debris	Monthly (or as accuired)
	Cut the grass – public areas	Monthly (during growing season)
	Cut the meadow grass	Half yearly (spring, before nesting season, and autumn)
	Inspect marginal and bankside vegetation and remove nuisance plants (for first 3 years)	Monthly (at start, then as required)
	Inspect inlets, outlets, bankbeds, structures, pipework etc for evidence of blockage and/or physical damage	Monthly
	Inspect water body for signs of poor water quality	Monthly (May – October)
	Inspect silt accumulation rates in any forebay and in main body of the pond and establish appropriate removal frequencies, undertake contamination testing once some build-up has occurred, to inform management and disposal options	Half yearly
	Check any mechanical devices eg pesticides	Half yearly
	Hand cut submerged and emergent aquatic plants (at minimum of 3.0 m above pond base; include max 25% of pond surface)	Annually
	Remove 25% of bank vegetation from water's edge to a minimum of 1 m above water level	Annually
	Tidy all dead growth (scrub clearance) before start of growing season (Note: tree maintenance is usually part of overall landscape management contract)	Annually
	Remove sediment from any forebay	Every 5–10 years, or as required
	Remove sediment and planting from one quadrant of the main body of ponds without sediment forebays.	Every 5 years, or as required
Occasional maintenance	Remove sediment from the main body of big ponds when pool volume is reduced by 20%	With effective pre-treatment, this will only be required rarely, eg every 25–50 years
Remedial actions	Repair erosion or other damage	As required
	Replant, where necessary	As required
	Aerate pond when signs of eutrophication are detected	As required
	Realign rip-rap or repair other damage	As required
	Repair / rehabilitate inlets, outlets and overflows.	As required

PONDS

TABLE 22.1 Operation and maintenance requirements for detention basins

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter and debris	Monthly
	Cut grass – for spillways and access routes	Monthly (during growing season), or as required
	Cut grass – meadow grass in and around basin	Half yearly (spring – before nesting season, and autumn)
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
	Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly
	Inspect bankbeds, structures, pipework etc for evidence of physical damage.	Monthly
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Monthly (for first year), then annually or as required
	Check any penstocks and other mechanical devices.	Annually
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from inlets, outlet and forebay	Annually (or as required)
	Manage wetland plants in outlet pool – where provided	Annually (as set out in Chapter 23)
Occasional maintenance	Reseed areas of poor vegetation growth	As required
	Prune and trim any trees and remove cuttings	Every 2 years, or as required
	Remove sediment from inlets, outlets, forebay and main basin when required	Every 5 years, or as required (likely to be minimal requirements where effective upstream source control is provided)
Remedial actions	Repair erosion or other damage by reseeding or re-turfing	As required
	Replacement of rip-rap	As required
	Repair / rehabilitation of inlets, outlets and overflows	As required
	Relevel uneven surfaces and reinstate design levels	As required

STORAGE BASINS

TABLE 17.1 Operation and maintenance requirements for swales

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter and debris	Monthly, or as required
	Cut grass – to retain grass height within specified design range	Monthly (during growing season), or as required
	Manage other vegetation and remove nuisance plants	Monthly, at start, then as required
	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly
	Inspect infiltration surfaces for ponding, compaction, silt accumulation; record areas where water is ponding for > 48 hours	Monthly, or when required
	Inspect vegetation coverage	Monthly, for 6 months, quarterly for 2 years, then half yearly
	Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies	Half yearly
Occasional maintenance	Reseed areas of poor vegetation growth, alter plant types to better suit conditions, if required	As required or if bare soil is exposed over 10% or more of the swale treatment area
Remedial actions	Repair erosion or other damage by re-turfing or reseeding	As required
	Reinstall uneven surfaces and reinstate design levels	As required
	Scarify and aerate topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface	As required
	Remove build-up of sediment on upstream gravel trench, flow spreader or at top of filter strip	As required
	Remove and dispose of oils or petrol residues using safe standard practices	As required

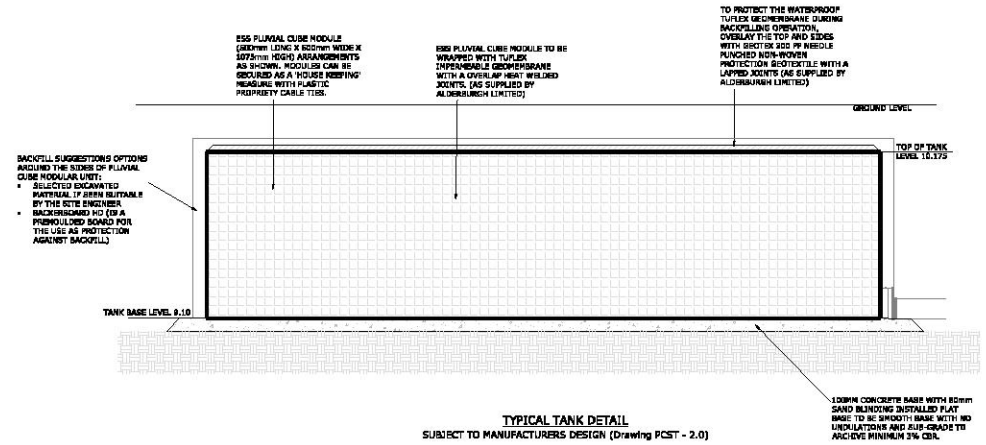
SWALES

TABLE 23.3 Operation and maintenance requirements for attenuation storage tanks

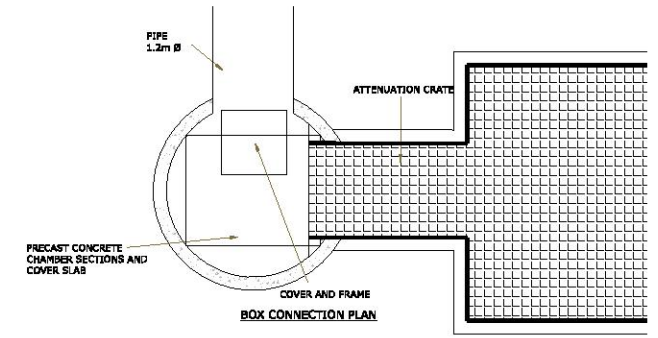
Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where (simple) infiltration into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary	Annually
	Remove sediment from pre-treatment structures and/or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

ATTENUATION TANK

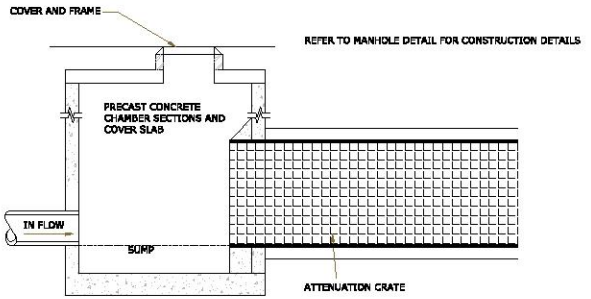
MAINTENANCE SCHEDULES FOR SURFACE WATER FEATURES



TYPICAL TANK DETAIL
SUBJECT TO MANUFACTURERS DESIGN (Drawing PCST - 2.0)



BOX CONNECTION PLAN



SECTION A-A

NOTE:
REFER TO YESS DRAWING PLST-2.0FOR FULL DETAILS OF TANK, VENTING REQUIREMENTS AND ALL OTHER DETAILS

NOTE:
THE CONTRACTOR SHALL PROHIBIT THE MOVEMENT OF CONSTRUCTION PLANT ABOVE THE TANK. MAINTENANCE/GRASS MOWING TO BE CARRIED OUT USING MANUAL METHODS ONLY. NO MACHINERY TO TRAFFIC OVER TANK.

PRINT ACCURACY INDICATOR 50mm 100mm

NOTES

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CONSTRUCTION (DESIGN AND MANAGEMENT) REGULATIONS 2015

DESIGNERS HAZARD INFORMATION FOR CONSTRUCTION

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REFER TO THE HEALTH AND SAFETY PLAN FOR FURTHER INFORMATION.

REV	DATE	REVISION	MADE	CHK	APP
C2	29.07.2020	UPDATED TO AS BUILT BASED ON INFORMATION SUPPLIED BY READIE CONSTRUCTION	TC	TC	TC
C1	14.06.19	UPDATED TO CONSTRUCTION	DS	DK	DK
T2	08.11.18	NOTE REGARDING TANK BY PHASE 3 CONTRACTOR ADDED	DK	LS	LS
T1	24.09.18	FIRST ISSUE	DK	AL	AL

DRAWING STATUS: **AS BUILT**

SUITABILITY DESCRIPTION: **SUITABLE FOR INFORMATION**

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190 Eureka Park, Upper Pemberton, Ashford, Kent TN25 4AZ
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Website: www.mlmgroup.com

CLIENT: readie

PROJECT: **AIRPORT BUSINESS PARK SOUTHEND**

DRAWING TITLE: **PHASE 2 INFRASTRUCTURE SURFACE WATER DRAINAGE CONSTRUCTION DETAILS SHEET 2**

DRAWN/DESIGN	CHK	MLM REF	STATUS	REVISION
SCALE 1:NTS @A1		582093	S2	C2

PROJECT	ORIGINATOR	VOLUME/SYSTEM	LEVEL/LOCATIONS	TYPE	ROLE	NUMBER
582093	MLM	P2	XX	DR	C	0018

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