iPLEX Pipelines

# NEXUSFLO™

SMOOTH BORE TWINWALL
SUBSOIL LAND DRAINAGE PIPES

**DESIGN & INSTALLATION GUIDE**

APRIL 2025

The Iplex® vision is to be the leading manufacturer and supplier of plastic building materials in New Zealand.

# CONTENTS

# CONTENTS




**Acknowledgements - Iplex Pipelines NZ thank the following for their contribution to this Design Guide.**

- Blackley Construction Ltd
- Hachette New Zealand Ltd, for permission to use selected materials from " The Drainage of Wet Soils " by Dermot G Bowler - published by Hodder & Stoughton, 1980

# NEXUSFLO™ SUBSOIL DRAINAGE PIPE: INTRODUCTION

NEXUSFLO™ is double wall, perforated polyethylene, subsoil drainage pipe, punched around the full circumference, designed to capture and remove excess subsurface ground water in the soil.

NEXUSFLO™ pipe combines a smooth inner wall with a corrugated outer wall. The two walls are welded together during manufacture resulting in a wall section with structural stiffness and smooth-bore hydraulic performance.

## COLOUR

NEXUSFLO™ pipe is coloured black with a permanently visible blue stripe for immediate visual identification.

## SIZES

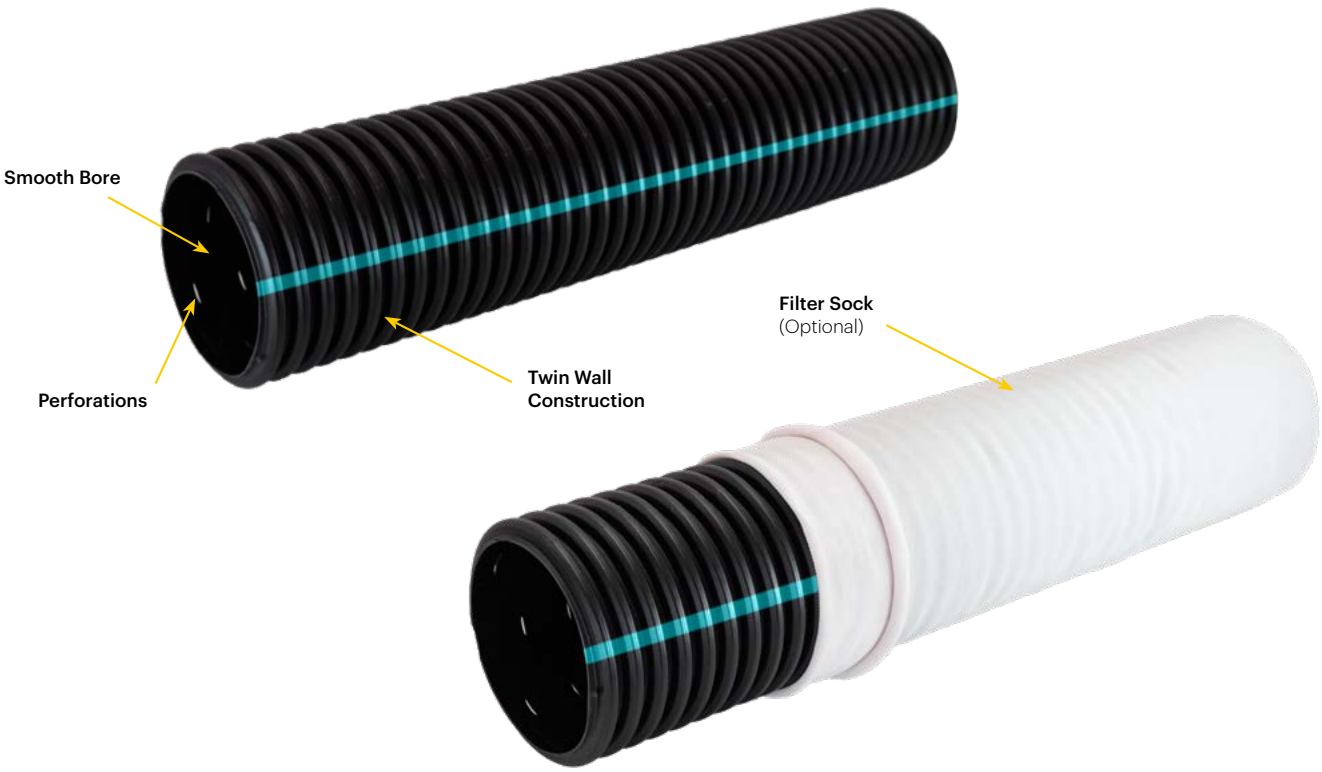
NEXUSFLO™ pipe is supplied in DN 110, DN 160 and DN 200mm nominal OD sizes and a range of coil lengths. Coils supplied with factory-fitted filter sock come wrapped in a protective plastic sheet, that helps prevent damage to the filter sock material during transport and site handling.

## STRUCTURAL PERFORMACE

NEXUSFLO™ pipe offers a minimum Pipe Stiffness of SN 6 (DN 110 & DN 160) or SN 4 (DN 200), for structural performance underground.

## NEXUSFLO™ SUBSOIL DRAIN - APPLICATIONS:

- Grassland pasture, dairy, sheep and beef
- Arable crops, seeds, fodder, silage, and grain
- Complement to Mole Drainage systems
- Intensive horticulture, vegetables and orchards
- Sports turf and playing fields,
- Spot drainage of hill country springs and localised wet zones
- Retaining walls and building foundations
- Subsoil drains conforming to NZTA F/5 for lightly loaded or load protected sections of the highway environment



## TYPICAL NEXUSFLO™ APPLICATIONS

Pasture drainage

Playing fields and sports turf drainage

Horticulture, row crop and orchard drainage

Road berm and shoulder drainage

Arable crop drainage

Retaining wall and foundation drainage

# PRODUCT RANGE

For easy identification, pipes in the NEXUS™ product family are colour coded using permanently visible coloured stripes. NEXUSFLO™ (punched) has a single blue stripe. NEXUSCOIL™ (unpunched) has a single yellow stripe.

## NEXUS (TWIN WALL - SMOOTH BORE)

| Product | Punched | Unpunched | Filter Sock (Optional) | Invert Unpunched | NZTA |
|---|---|---|---|---|---|
|  NEXUSFLO™ | ✓ | | ✓ | | ✓ NZTA F/5 |
|  NEXUSCOIL™ | | ✓ | | | |
|  NEXUS HI-WAY | ✓ | | ✓ | ✓ NZTA F/2 | ✓ NZTA F/2 |
|  NEXUS CULVERT | | ✓ | | | |
|  NEXUS CULVERT | | ✓ | | | |

## NOVAFLO & NOVACOIL (SINGLE WALL - CORRUGATED BORE)

| Product | Punched | Unpunched | Filter Sock (Optional) |
|---|---|---|---|
|  NOVAFLO™ | ✓ | | ✓ |
|  NOVACOIL™ | | ✓ | |

## NEXUSFLO™ COUPLERS AND ASSOCIATED FITTINGS

NEXUSFLO™ and NEXUSCOIL™ pipe coils are supplied with factory-fitted couplers. Additional couplers and other fittings designed for use with NEXUS pipes are available as follows:

| Product | Product code | Size (mm) | Ctn/Bag QTY |
|---|---|---|---|
|  **junction** | 104.65.45 | 65 | 35 |
| | 104.100.45 | 110 | 12 |
| | 704.150.45 | 160 | 4 |
| | 704.150.100.45 | 160 x 110 | 5 |
|  **pipe coupler** | 410.065 | 65 | 195 |
|  **pipe coupler** | 420.110 | 110 | 40 |
| | 420.160 | 160 | 12 |
| | 420.200 | 200 | 10 |
| | 420.250 | 250 | 1 |
|  **level invert F&F** | 123.150.100S | 160 x 110 | 1 |
|  **flexible push-on cap** removable flexible cap for pipe end protection | 430.110 | 110 | 1 |
| | 430.160 | 160 | 1 |

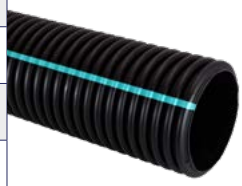
**Pipe coupler**

**Filter sock**

**PVC junction**

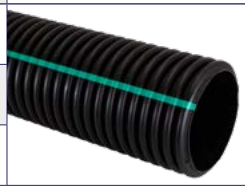
# SECTION 2
PRODUCT RANGE

## PRODUCT RANGE

| Product | Product code | Nominal OD (mm) | Nominal ID (mm) | Length of coils (m) | SN | Colour |
|---|---|---|---|---|---|---|
| **NEXUSFLO™ (punched)** | NEXUS11015 | 110 | 95 | 15 | 6 |  |
| | NEXUS11030 | 110 | 95 | 30 | 6 | |
| | NEXUS11050 | 110 | 95 | 50 | 6 | |
| | *NEXUS110100 | 110 | 95 | 100 | 6 | |
| | NEXUS110450 | 110 | 95 | 450 | 6 | |
| | *NEXUS16045 | 160 | 135 | 45 | 6 | |
| | NEXUS160185 | 160 | 135 | 185 | 6 | |
| | NEXUS2005 | 200 | 175 | 5 | 4 | |
| | NEXUS20029 | 200 | 175 | 29 | 4 | |
| | NEXUS200120 | 200 | 175 | 120 | 4 | |
| **NEXUSCOIL™ (unpunched)** | NEXUSCOIL11015 | 110 | 95 | 15 | 6 |  |
| | NEXUSCOIL11030 | 110 | 95 | 30 | 6 | |
| | NEXUSCOIL11050 | 110 | 95 | 50 | 6 | |
| | NEXUSCOIL110100 | 110 | 95 | 100 | 6 | |
| | NEXUSCOIL110450 | 110 | 95 | 450 | 6 | |
| | NEXUSCOIL16045 | 160 | 135 | 45 | 6 | |
| | NEXUSCOIL160185 | 160 | 135 | 185 | 6 | |
| | NEXUSCOIL20029 | 200 | 175 | 29 | 4 | |
| | NEXUSCOIL200120 | 200 | 175 | 120 | 4 | |

| Product | Product code | Nominal OD (mm) | Nominal ID (mm) | Length of coils (m) | SN | Colour |
|---|---|---|---|---|---|---|
| **NEXUS® HI-WAY** | NEXUS1105HD | 110 | 95 | 5 lengths | 10 |  |
| | NEXUS11050HD | 110 | 95 | 50 | 10 | |
| | NEXUS110100HD* | 110 | 95 | 100 | 10 | |
| | NEXUS1605HD | 160 | 135 | 5 lengths | 10 | |
| | NEXUS16045HD* | 160 | 135 | 45 | 10 | |
| | NEXUS2005HD | 200 | 175 | 5 lengths | 5 | |

* These coil sizes of Nexusflo 110 and Nexusflo 160 can also be supplied fitted with filter sock. Minimum order quantities and delivery lead times apply. Contact Iplex Pipelines on 0800 800 262 for assistance.

| Product | Product code | Nominal OD (mm) | Nominal ID (mm) | Length of coils (m) | SN | Colour |
|---|---|---|---|---|---|---|
| **NEXUS® CULVERT** | NEXUSCULVERT1105 | 110 | 95 | 5 | 5 |  |
| | NEXUSCULVERT1605 | 160 | 135 | 5 | 5 | |
| | NEXUSCULVERT2005 | 200 | 175 | 5 | 5 | |
| | NEXUSCULVERT2506 | 250 | 225 | 6 | 5 | |
| **NEXUS® CULVERT** | NEXUSCULVERT3156 | 353 | 300 | 6 | 6 |  |
| | NEXUSCULVERT4006 | 442 | 375 | 6 | 6 | |
| | NEXUSCULVERT5006 | 531 | 450 | 6 | 6 | |

## NEXUSFLO™ & NEXUSCOIL DIMENSIONS AND STATISTICS

| | | | | | | |
|---|---|---|---|---|---|---|
| **Nominal outside diameter (mm)** | 110 | 110 | 160 | 160 | 200 | 200 |
| **Length per coil (m)** | 100 | 450 | 45 | 185 | 29 | 120 |
| **Nominal coil weight (kg)** | 49 | 220 | 41 | 167 | 41 | 170 |
| **Nominal coil volume ($m^2$)** | 1.5 | 4.0 | 1.2 | 6.1 | 1.5 | 4.1 |

### NEXUSFLO™ PUNCHED

### NEXUSFLO™ WITH FILTER SOCK

### NEXUSCOIL™ UNPUNCHED

NEXUSCOIL™ (yellow stripe) can complement a NEXUSFLO™ system, where punched holes in the pipe are not needed, such as for passing near trees, and for contained "point to point" gravity flow of stormwater.

# SOIL STRUCTURE AND HEALTHY PLANT DEVELOPMENT: AGRICULTURAL PRODUCTION AND SPORTS TURF

## IMPROVED SOIL STRUCTURE

Well drained fields are less liable to compaction from stock and machinery. Water-logging can be reduced which helps keep soil friable and sensitive crops healthy. Improved structure in well drained soil can absorb and retain more water, thus minimising run-off and associated surface erosion.

## LONGER AVAILABLE SEASON FOR PLAYING FIELDS AND SPORTS TURF

Subsoil drainage supports healthy and more durable sports turf, with increased intensity and frequency of use and the length of playing season.

## HIGHER AGRICULTURAL CROP YIELD

Well drained, aerated soils can warm faster, for quicker, more even plant germination, improved root development, and greater ability to benefit from other crop management inputs, such as fertilizer. Healthy root structures can promote higher yields and increased drought resilience. NOVAFLO™ drainage optimises opportunities to plant early, harvest at the best time, use longer season hybrids or crops, and improve the chance to complete all field operations precisely in time for maximum yields.

## WATER TABLE CONTROL

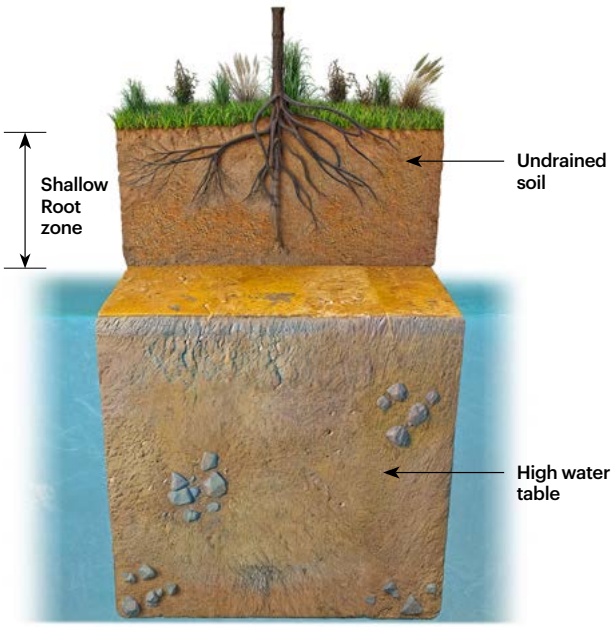
Subsoil drainage is more than simply lowering the water table. It also controls the soil water content by removing excess water from the soil, providing a better environment for the roots of growing crops. NEXUSFLO™ drainage installed at the proper spacings, depths and grades can aid water table control.

## ADVANTAGES OF FASTER LAND DRAINAGE

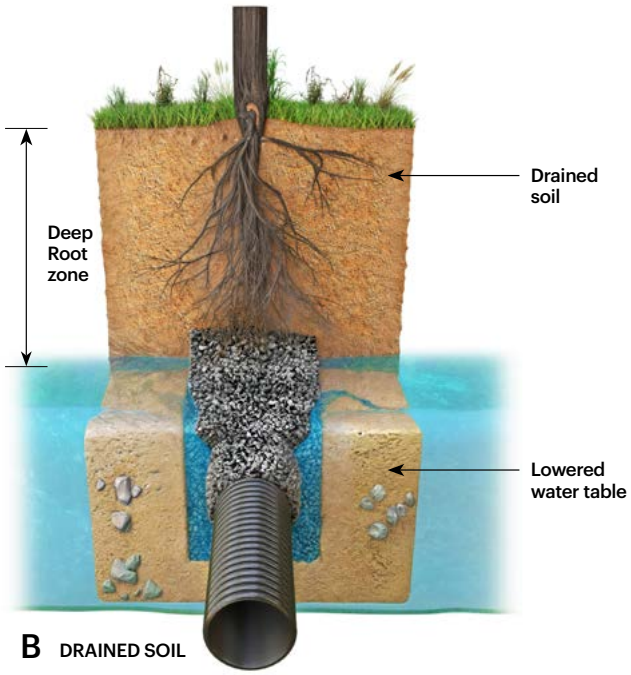
Tests conducted at Massey University have quantified the improved flow results achieved by Iplex NEXUSFLO™ smooth bore pipe, compared with Iplex NOVAFLO™ corrugated bore pipe. NEXUSFLO™ provides less turbulent water flow through the pipe than the corrugated bore NOVAFLO™. This results in higher flow velocity, which delivers to a greater volume of flow compared with NOVAFLO™ given the same installation parameters.

## IMPROVED ROOT DEVELOPMENT

Plants growing in soil with high water tables in spring can develop weak, shallow root systems. (Refer **A** below) As the water table recedes, roots cannot absorb much water and plants can start to wilt more easily in drought conditions. By contrast, in a well drained soil, plants put down deep, well distributed roots (Refer **B** below) because the water table is lower, early in the plant's development. In dry periods, these plants are more resilient and can still reach available water. Sturdier, well-rooted plants can also withstand wind better than poorly rooted plants.

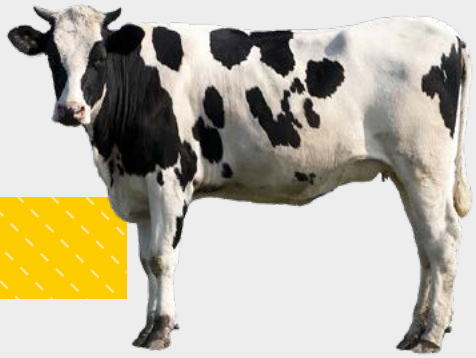



**A** UNDRAINED SOIL




**B** DRAINED SOIL

## WHY CHOOSE THE IPLEX NEXUS RANGE?



**1** **Higher Flow Velocity -** Reduced chance of silting
- Less maintenance
- Longer service life

**2** **Greater Flow Volume - Faster Land Drainage**

**3** **Less Short Term Pasture Damage**
- More palatable grazing
- Faster pasture recovery

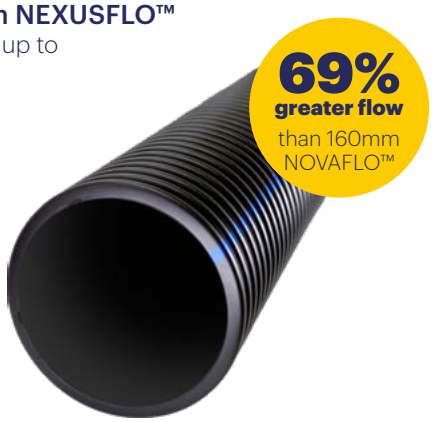
**4** **Less Long Term Soil Damage (Compaction)**
- Improved surface drainage
- More pasture growth (kgDM/h)

**5** **Reduced Duration of Water Logging in the Root Zone**
- More pasture growth (kgDM/h)

**6** **More Flexibility in Stock Placement During Wet Months**
- Easier farm management

| Summary of flow comparison between Iplex NEXUSFLO™ (smooth bore) and Iplex NOVAFLO™ (corrugated bore) | | | | |
|---|---|---|---|---|
| 110mm NOVAFLO™ | + | 49% extra flow | = | 110mm NEXUSFLO performance |
| 110mm NEXUSFLO™ | + | 38% extra flow | = | 160mm NOVAFLO™ performance |
| 160mm NOVAFLO™ | + | 69% extra flow | = | 160mm NEXUSFLO performance |
| 160mm NEXUSFLO™ | + | 83% extra flow | = | 200mm NEXUSFLO performance |

**160mm NEXUSFLO™**
delivers up to




**110mm NEXUSFLO™**
delivers up to

# NEXUSFLO™ SUBSOIL DRAINAGE
# PRINCIPLES OF DESIGN AND FUNCTION

## WHAT CAUSES WET LAND?

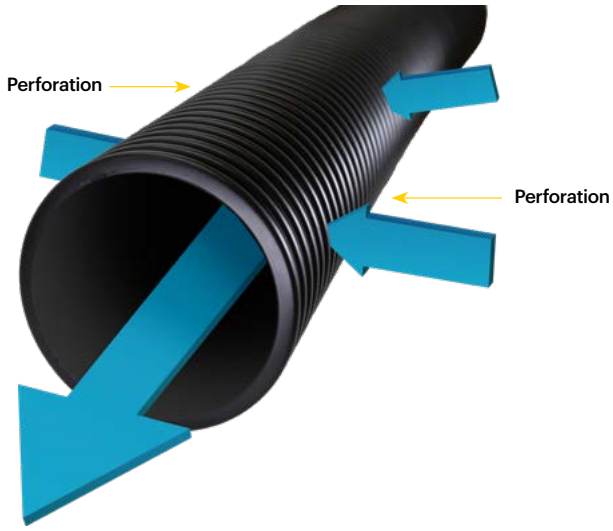
1. **Run-off and springs** discharging from elevated land areas onto lower flat land
2. **Perched water table,** above an impermiable barrier layer in the soil such as iron pan or a clay zone, causing water saturation at shallow depths in the top soil, for example in yellow-grey earths
3. **Seasonal rising water table,** from deeply placed barrier layers, often associated with higher permiability soils, for example in yellow brown sands

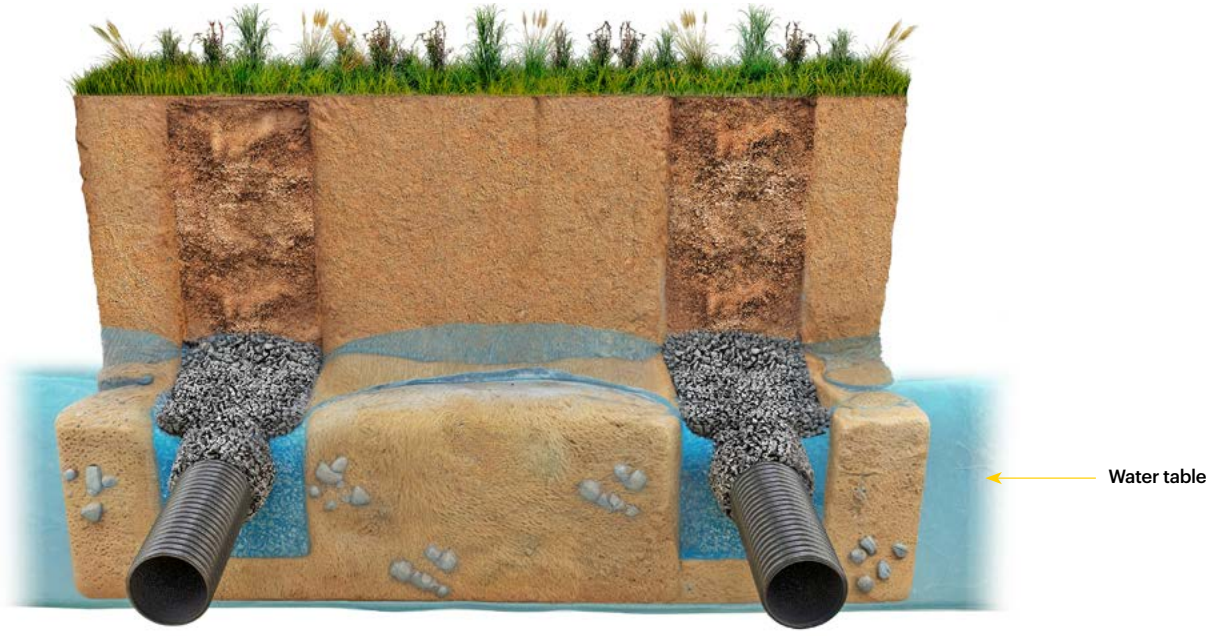
These conditions may often be found in complex combinations. In a wet saturated soil, the function of a NEXUSFLO™ subsoil drain, is to allow surplus soil water, moving by gravity, to enter the pipe through the punched holes in the pipe wall, and flow away.

The water table in the saturated soil is lowered or "drawn down" to the the Nexusflo pipe, within the drainage zone of influence.

**Note:** The drainage influence of Nexusflo may be complemented in low permiability soils by associated mechanical soil conditioning treatments such as mole draining, where appropriate (see Page 20).

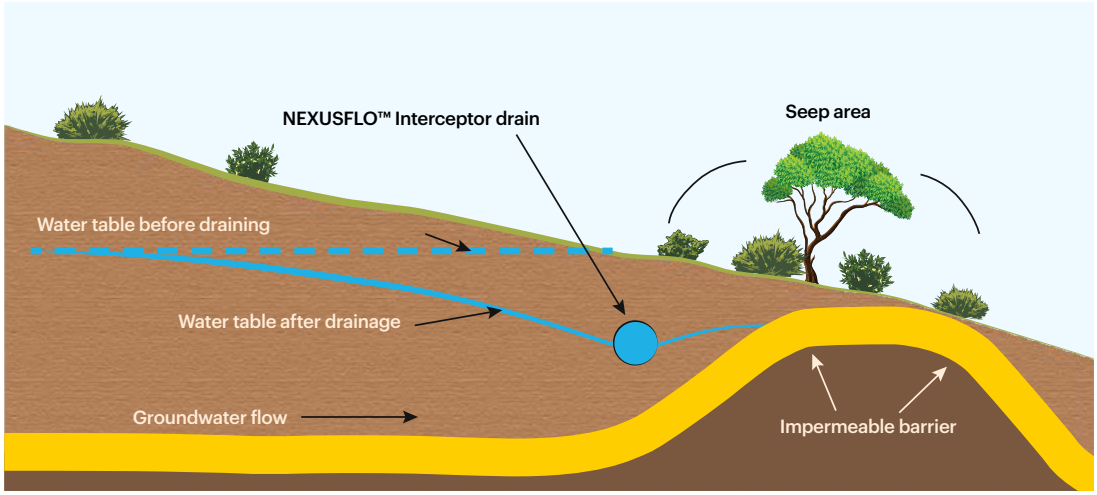
## HOW WATER ENTERS NEXUSFLO™



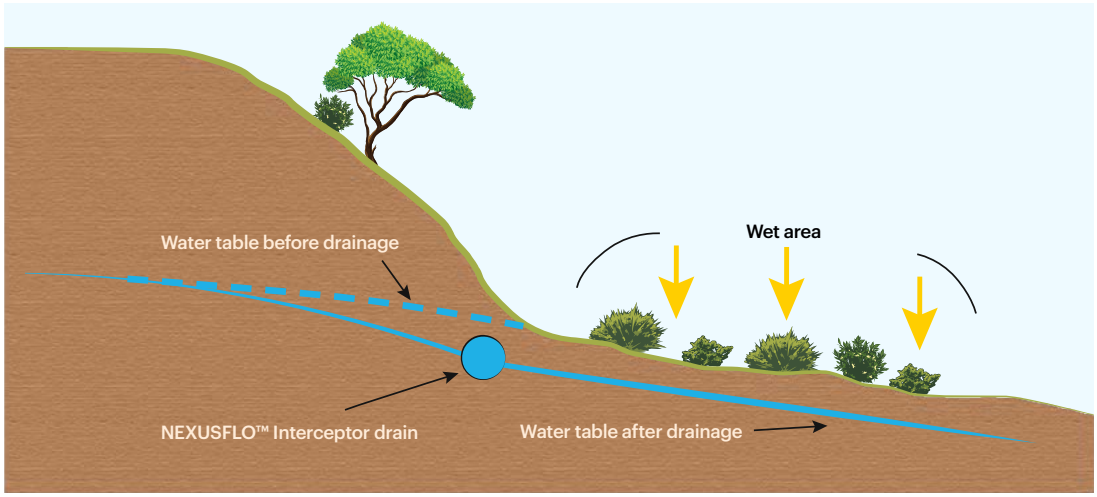




**Parallel NEXUSFLO™ subsoil drains, in a deep, permiable soil, showing the draw-down of the watertable to the drains**

## EXAMPLES OF NEXUSFLO™ DRAIN LOCATIONS




**NEXUSFLO™ drainage of an underground spring and associated wet area, caused by a "perched" watertable above a impermeable barrier layer in the soil.**

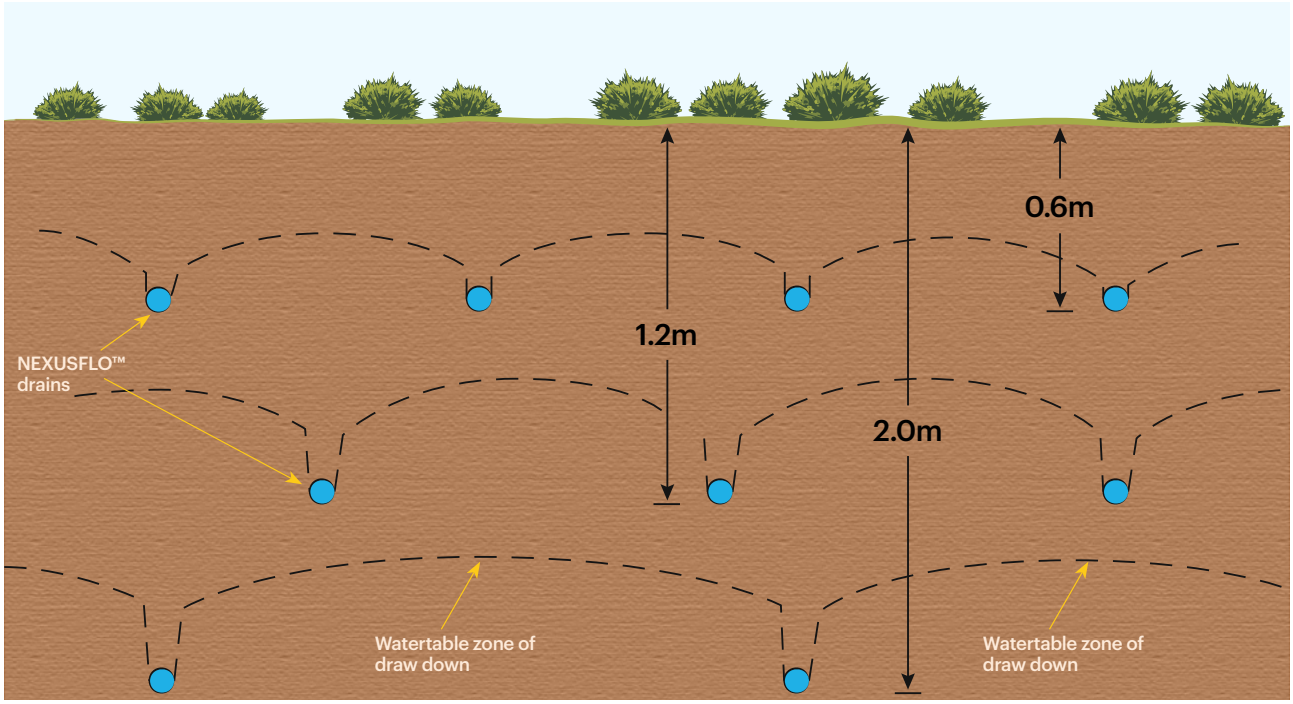



**NEXUSFLO™ drainage of an underground spring and wet seepage area, caused by a "raised" watertable.**

## DRAIN SPACING

There is a limit on the zone of drainage effect of a single NEXUSFLO™ subsoil pipeline, influenced by the pipe depth and the hydraulic conductivity of the surrounding soil Where the subsoil drainage effect of one Nexusflo pipe is insufficent, more drains may be installed, often located in parallel and there is a need to determine the optimum spacing between the drains. The drain spacing should be designed so that the water table, midway between the drains is "drawn down" at least 300mm below the ground surface in wet season conditions.

# SECTION 4
## NEXUSFLO™ SUBSOIL DRAINAGE - PRINCIPLES OF DESIGN AND FUNCTION




**Examples of the relationship between depth and spacing of NEXUSFLO™ drainage pipe lines, under assumed conditions.**

### Permiability and Hydraulic Conductivity of the soil - influence on drain spacing

- **Soil Permiability** is the ability of the soil to transmit water or air through itself.
- **Hydraulic Conductivity,** (measured in mm/hr), is the numericial value for the soil permiability, and is the verticial transmission rate of water through saturated soil, under gravity, (Refer Examples in Table below)

Coarse grained soils, such as sands and sandy loam, can be associated with high Permiability and Conductivity. Very fine textured soils such as clays and clay loams, can be associated with very low natural Permiability.

| Soil Permiability | Saturated Hydraulic Conductivity | Approximate Soil Textural Class |
|---|---|---|
| Class 1 very slow | Less than 1mm/hour | Clay |
| Class 2 slow | 1 - 5mm/hour | Clay loam |
| Class 3 moderately slow | 5 - 20mm/hour | Silty clay loam |
| Class 4 moderate | 20 - 60mm/hour | Silt loam |
| Class 5 moderately rapid | 60 - 125mm/hour | Loam |
| Class 6 rapid | 125 - 250mm/hour | Sandy loam |
| Class 7 very rapid | More than 250mm/hour | Sand |

# SECTION 4
## NEXUSFLO™ SUBSOIL DRAINAGE - PRINCIPLES OF DESIGN AND FUNCTION

**Suggested NEXUSFLO™ Drain Spacing may be calculated using the following equation:**

$$S = \sqrt{\frac{4P\,(b^2 - a^2)}{Qd}}$$

where S = spacing of pipe lines (metres)

a = average depth of pipe line above impermiable zone (metres)

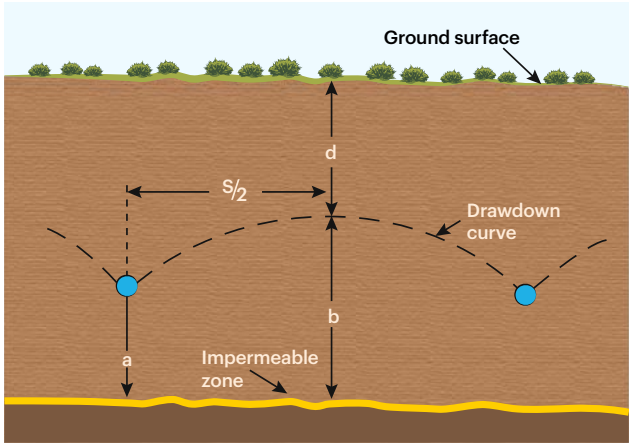
P = hydraulic conductivity (millimetres per hour)

b = depth from drawdown curve to barrier layer at midpoint between the drain lines (metres)

Qd = drainage coefficient (millimetres per hour (Ref.: Page 18)

**For example:**

1. Parallel Nexusflo drains to be installed at 1.2m deep
2. Soil profile examination indicates an impermiable barrier layer at 2.5m below the ground surface, therefore (**a** = 2.5 - 1.2 = **1.3m**)
3. Minimum Depth (**d**) from ground surface to the drawn-down watertable required is 0.3m, therefore (**b** = 2.5 - 0.3 = **2.2m**)
4. Assumed average hydraulic conductivity (**P**) of the subsoil is 50mm/hour
5. The desired drainage coefficient (**Qd**) is 20mm in 24 hours = 0.833mm/hour




therefore:

$$S = \sqrt{\frac{4(50)(2.2^2 - 1.3^2)}{0.833}} = \mathbf{27.5m}$$

In practice, spacing could be arranged at between 27.5m and 30m to meet the convenience of layout.

Note: A barrier layer may be difficult to identify and sometimes amounts to little more than a change in soil texture. In homogenous soil profiles where no barrier is present, it is assumed that it occurs at a depth equal to 2x the drain depth.

### SUGGESTED NEXUSFLO DRAIN SPACING

The following table gives a guide for Nexusflo drain spacing proportional to drain depth and soil type However, land utilisation factors such as field area, crop or tree spacing, and vehicular access must all be considered. The standard suggested design for grazed pasture is a 20m drain spacing for beef cattle and 60m for sheep.

| Approximate Soil Textural Class | Suggested effective drainage distance each side of pipe (m) at a drainage depth of | | Effective saturated hydraulic conductivity (mm/hour) | A General Description of Soil Permeability |
|---|---|---|---|---|
| | 0.6 - 0.9m | 0.9 - 1.2m | | |
| Sand | 15.2 - 22.9 | 22.9 - 45.7 | more than 250 | medium to high |
| Sandy Loam | 12.2 - 15.2 | 15.2 - 22.9 | 125 - 250 | medium |
| Loam | 10.7 - 13.7 | 12.2 - 15.2 | 60 - 125 | medium to low |
| Silt Loam | 6.1 - 9.1 | 7.6 - 10.7 | 20 - 60 | low |
| Clay Loam | 5.3 - 6.1 | 6.1 - 7.6 | 1 - 5 | very low |
| Clay | 3.6 - 4.6 | 4.8 - 5.3 | Less than 1 | very low to practically impermeable |

# DRAINAGE COEFFICIENT

The Drainage Coefficient (**Qd**) is an essential factor in effective design of subsoil drainage systems, with direct influence on final performance, cost and efficiency of the drain system.

*The Drainage Coefficient is defined as the Depth of Water (in mm) which must be removed in a 24 hour time period, to provide for a particular land use.*

The more sensitive the land use or crop is, to wet conditions, the higher the Drainage coefficient should be (refer to the Table left and the Flow Chart on the page 19). Typical examples of land use requiring a high drainage coefficient may include intensively used sports turf, playing fields, "wet-sensitive" arable crops such as maize, barley, and vegetables, and horticultural orchards.

These suggested values for Drainage Coefficients apply to fine texture soils which would respond to Mole draining (refer also the NEXUSFLO™ pipe flow chart on page 19).

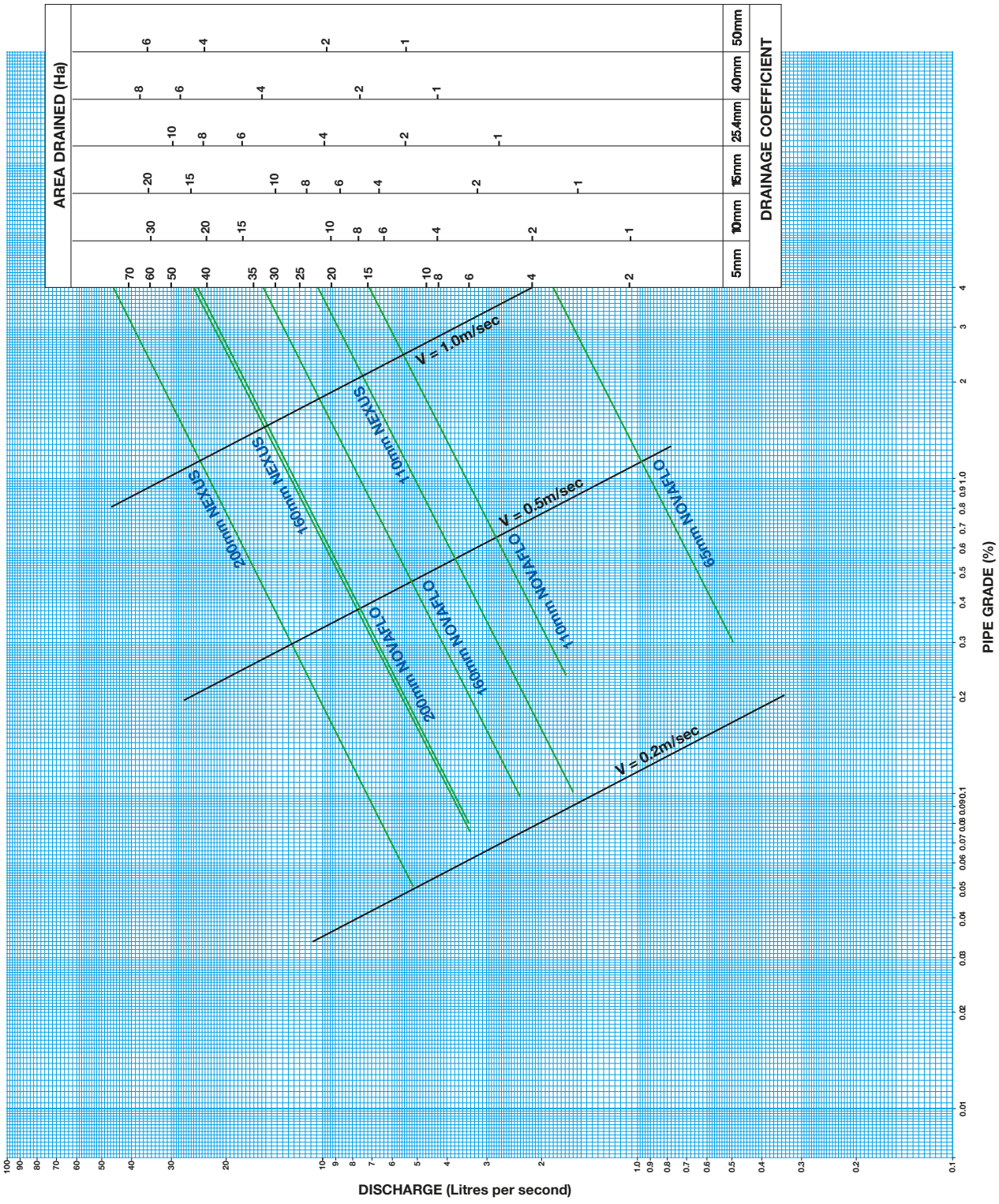
## DRAINAGE COEFFICIENT VS LAND USE

| Land use | Drainage coefficient (**Qd**) mm in 24 hours |
|---|---|
| Playing fields, horticultural crops, orchards, special livestock areas | 30 - 50 |
| Dairy farms (winter milk) | 25 |
| Dairy farms (seasonal), playing fields (used infrequently) | 15 - 20 |
| Intensive livestock and cropping farms | 10 - 15 |
| Mainly grassland farming | 5 - 10 |

**Wellington Sports Stadium. Installing Iplex NEXUSFLO™ during construction.**

**Wellington Sports Stadium. Completed playing surface after construction.**

## IPLEX NEXUSFLO™ & IPLEX NOVAFLO™ SUBSOIL DRAINAGE PIPE FLOW CHART

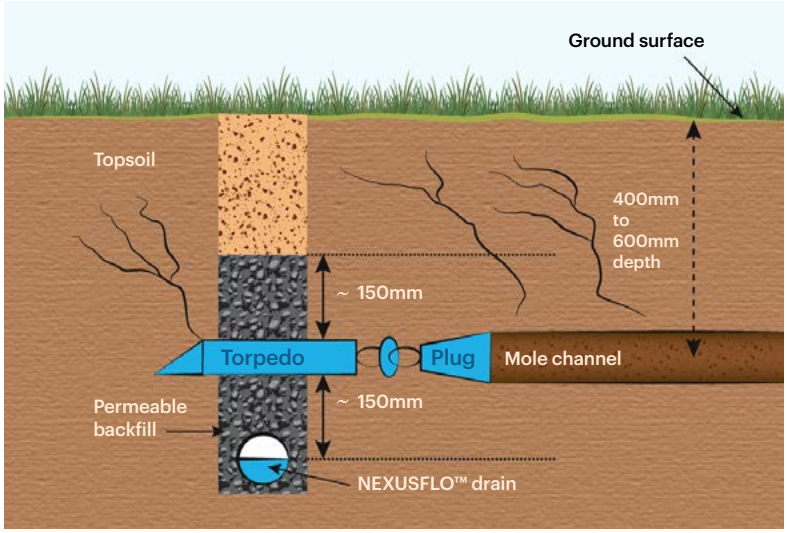


# MOLE DRAINAGE AND NEXUSFLO™

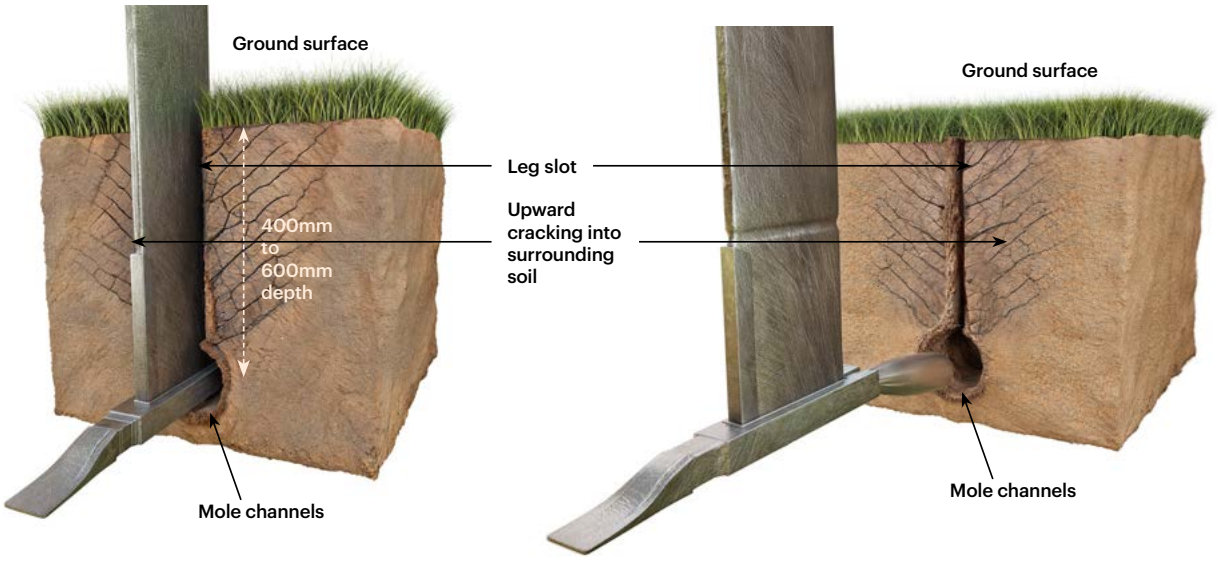
In soils of normally low natural permiability, such as heavy clay and clay loams, the subsoil drainage function of a NEXUSFLO™ drainage system may be complemented by "conditioning" the soil profile using Mole Drainage. Mole drainage is made possible by pulling a mole expansion plug through the ground at approximately 400mm to 800mm depth, on a carefully controlled grade.

The plug is attached to and trails behind a torpedo attached to the end of a tractor drawn vertical blade, smearing the sides of the mole channel to improve its durability. As the plug and blade is drawn through the ground, the surrounding soil profile is "conditioned" by fracturing and "heaving", creating many new pathways for water to travel by gravity down to the Mole channel or hole formed by the plug.

The mole channels transport the water to intersection points crossing the deeper NEXUSFLO™ drains, where the water then enters the NEXUSFLO™ pipes and drains away to the outlet.




**Forming the mole channel to through permiable backfill (drainage aggregate ) above the NEXUSFLO™ drain**




**Fracture pattern in the soil associated with mole ploughing**

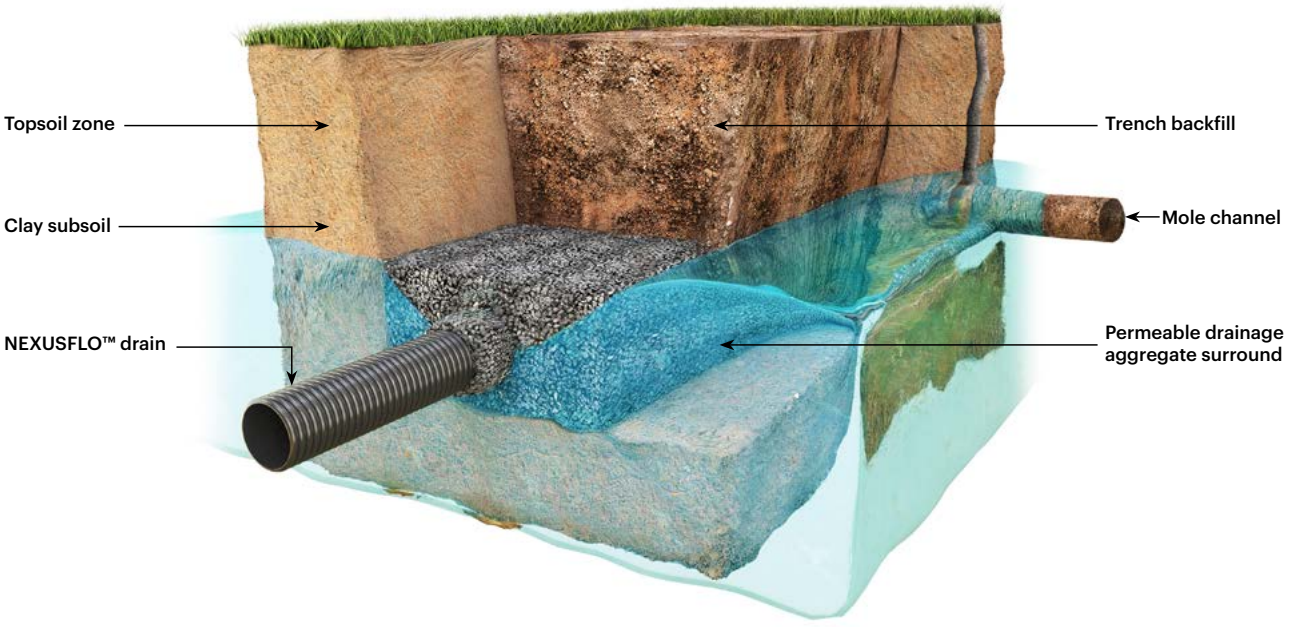
To be durable and function effectively, the mole channels must be drawn into a layer in the subsoil which has high clay content. Sands, coarse silts, gravels and ironstone soils are generally unsuitable for moling. Seasonal timing for pulling the moles is critical and research suggests that mole channel function is improved by not carrying water in the same season that they are pulled in.

Mole draining is carried out in the spring when the soil starts to dry out after the winter, but before it becomes too dry and difficult to pull the mole plough or form effective mole channels.

The shattered soil and mole channels then dry out over the summer, extending the life of the mole system.

**Tractor with Mole plough being used in field**

**Mole plough, blade, torpedo and plug**




**Mole channels feeding water into the NEXUSFLO™ subsoil drain**

# USE OF FILTERS

If a NEXUSFLO™ subsoil drainage system is needed in low permiability soil, then simply installing the pipe and backfilling it only with topsoil or the as-dug excavated material is not recommended as best practice, as this material can compact and reduce or prevent water moving into the pipe over time. In soils prone to migration of fines, such as mobile sands, and silts, the fine material can migrate with the drainage water, into the pipe, to cause silting and blockage.

Porous drainage aggregate (no fines) used as backfill, can provide structural support to the pipe, and help to provide a pathway for water entering from the ground surface and trench walls to the pipe, Drainage aggregate backfill is recommended for connecting water flow from mole channels to the NEXUSFLO™ pipe. The size grade of aggregate backfill used can influence the flow velocity of the drainage water and the associated migration of fines.

**NEXUSFLO™ with factory fitted Filtersock, for use in mobile sandy soils**

## FILTER MATERIALS

In silty or sandy soils where migrating fine particles can be washed into the pipe, thus eventually causing silting, a filter zone surrounding the pipe itself (consisting of carefully chosen filter aggregate with "no fines" particle size range) can be used to impede the ingress of fines.

In fine mobile sandy soils, where large amounts of sand fines from the backfill are known to enter and clog the gravel envelope and the pipe, this can be impeded by using factory fitted Filtersock filter fabric, directly on the pipe, or by applying a suitable permiable Geotextile filter fabric, on site, fully enclosing the drainage aggregate. Geotextile wrap can be beneficial in maintaining the subsoil drainage effect near roads, and behind retaining walls.

**NEXUSFLO™ installed with geotextile surround of the drainage aggregate bedding and backfill envelope, in mobile sandy soil**

## BACKFILL

An envelope of granular drainage aggregate backfill around the NEXUSFLO™ drain pipe will provide structural support to the pipe, and improves the flow of soil water into the pipe by increasing the effective surface diameter of the drain.

In permeable soils, water flows into the drain mainly through entry points at the sides and bottom of the drain pipe, and the gravel envelope, should completely surround the NEXUSFLO™ drain pipe to be fully effective.

**Introducing filter aggregate backfill as the NEXUSFLO™ pipe is laid**

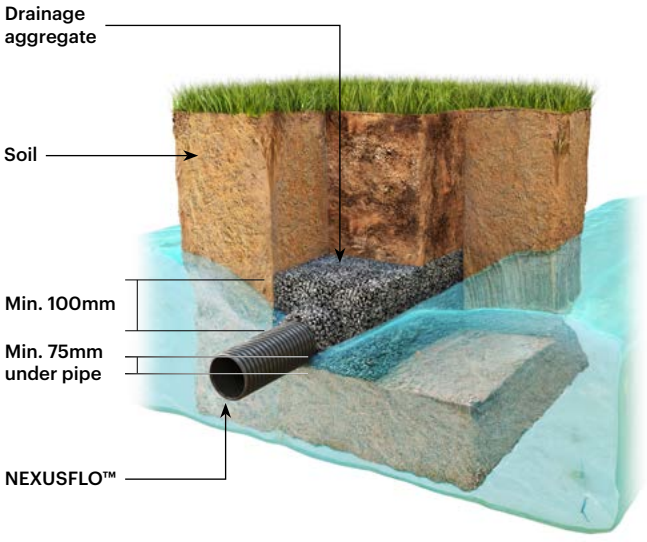
## NEXUSFLO™ DRAINAGE OF IRON OCHRE SOILS

In water logged soils, and saturated peats, known to be subject to iron ochre formation, the exposure of iron laden water to the aerobic environment in the drains causes precipitation of the desolved iron, from the actions of iron bacteria, leaving a red or brown sludge in the pipe which can cause blockage.

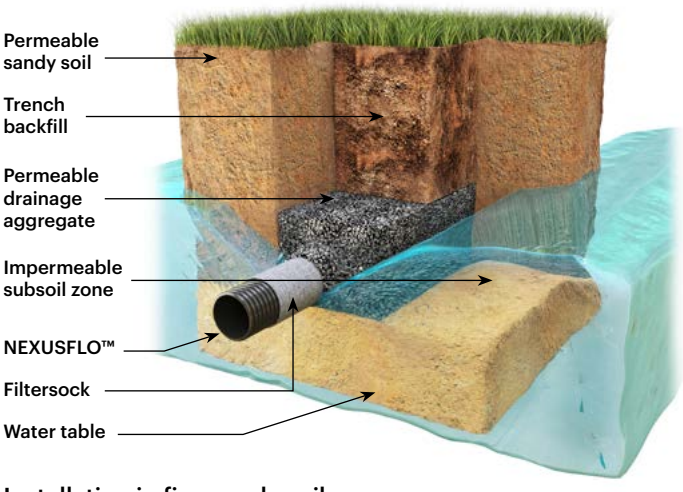
The only effective solution to iron ochre formation is by designing the NEXUSFLO™ system with access points from the surface, for periodic maintainance by water jetting, at pressures not exceeding 7.5MPa (1100 psi) to physically remove the sludge. Water jet cleaning is recommended within 12 months of initial installation, with followup every 3 to 5 years as needed.

**Access point in a NEXUSFLO™ drain system for water jetting**

**Water jetting head for removing iron ochre**

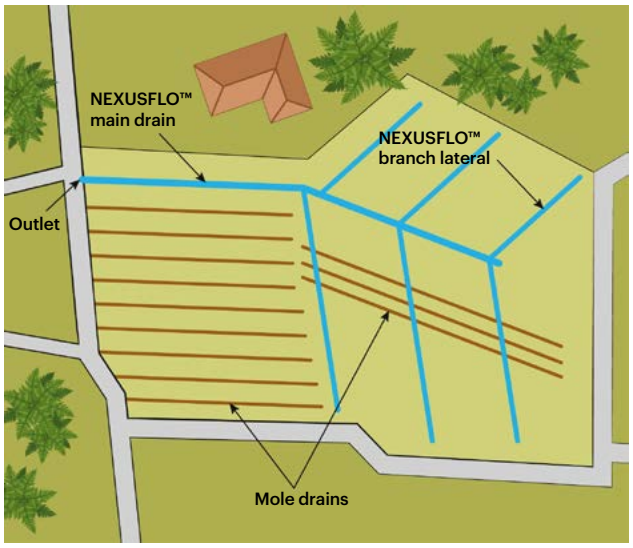



**Standard installation in permeable non-sandy soils - NEXUSFLO™ encased in drainage aggregate envelope designed as a filter**




**Installation in fine sandy soils**

# TYPICAL PASTURE OR CROPPING LAND DRAINAGE SYSTEM LAYOUT, WITH NEXUSFLO™ LATERAL AND MAIN DRAINS, COMPLEMENTED WITH MOLE DRAINS




## FLEXIBILITY

NEXUSFLO™ pipe can be installed continuously around curves and bends, allowing installation in long continuous lengths.

## MINIMUM GRADIENTS WITH NEXUSFLO™

NEXUSFLO™ can work effectively on low gradients., when accurately installed using laser guided control of gradient and depth. The minimum allowable gradient (slope) allowed for trench and NEXUSFLO™ pipe should be as follows:

| NEXUSFLO™ nominal OD (mm) | Min. recommended gradient (%)* | Min. recommended gradient (m)* | Min. recommended gradient (m) |
|---|---|---|---|
| | | | Corrugated bore Novaflo™ |
| 110 | 0.1 | 1 in 1000 | 1 in 400 |
| 160 | 0.07 | 1 in 1500 | 1 in 1000 |
| 200 | 0.05 | 1 in 2000 | N/A |

* Based upon minimum recommended flow velocity of 0.2m/sec (small risk of silting from clay particles and fine silts). Where coarse silts or fine sands could enter the pipe, steeper gradients and higher minimum flow velocities should be used. Designers and installers of NEXUSFLO™ systems should refer to NZAEI. Guide to Subsurface Land Drainage – May 1988 for more information.

## LASER CONTROL OF NEXUSFLO™ INSTALLED GRADIENT

**Typical position of the laser receiver, linked to the excavator hydraulic system, controlling the trench gradient and depth, as the NEXUSFLO™ pipe is continuously installed**

**Typical position of the laser emitter, which delivers a level "plane " of laser light across the work site; used by the receiver as a reference point to apply grade control at the excavator**

# ROAD DRAINAGE

**NEXUSFLO™ pipe delivers the requirements of NZTA F/5 - SPECIFICATION FOR CORRUGATED PLASTIC PIPE SUBSOIL DRAIN CONSTRUCTION.**

This New Zealand Transport Authority (NZTA) Specification refers to the use of perforated corrugated plastic pipe of up to 110mm nominal outside diameter in subsoil drains under light duty conditions, e.g. for use in agricultural land, playing fields and lightly loaded or load protected sections of the highway environment.

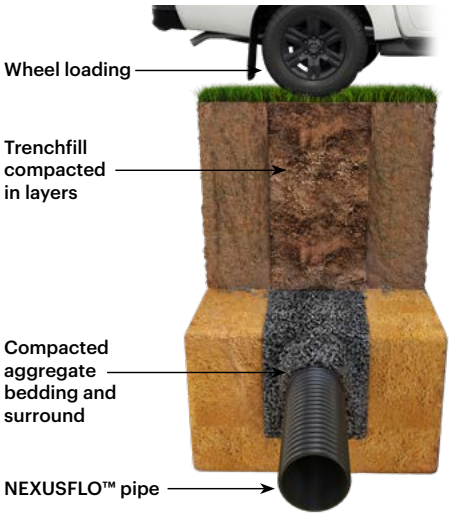
Nexusflo installed in the road shoulder or berm can effectively intercept and drain away excess ground water from surrounding areas, and lower the water table under the road, preventing destabilisation of the sealed road surface.

## STRUCTURAL PERFORMANCE

NEXUSFLO™ offers a minimum Pipe Stiffness of SN 6, (DN 110 & DN 160) or SN 4 (DN 200), for structural performance under road shoulders and berms, farm roads and race ways and general underground application (tested to AS/NZS 1462.22).

**The Problem**
The sealed surface layer of a road has been lifted and destabilised by a rising water table from surrounding saturated ground, leading to potholes and damaged road formation.

**The Solution**
NEXUSFLO™ placed in the road shoulder parallel to the road carriage way, intercepting the ground water flow, and lowering the water table under the carriage way, thus protecting the integrity of the bitumen or chip seal surface.

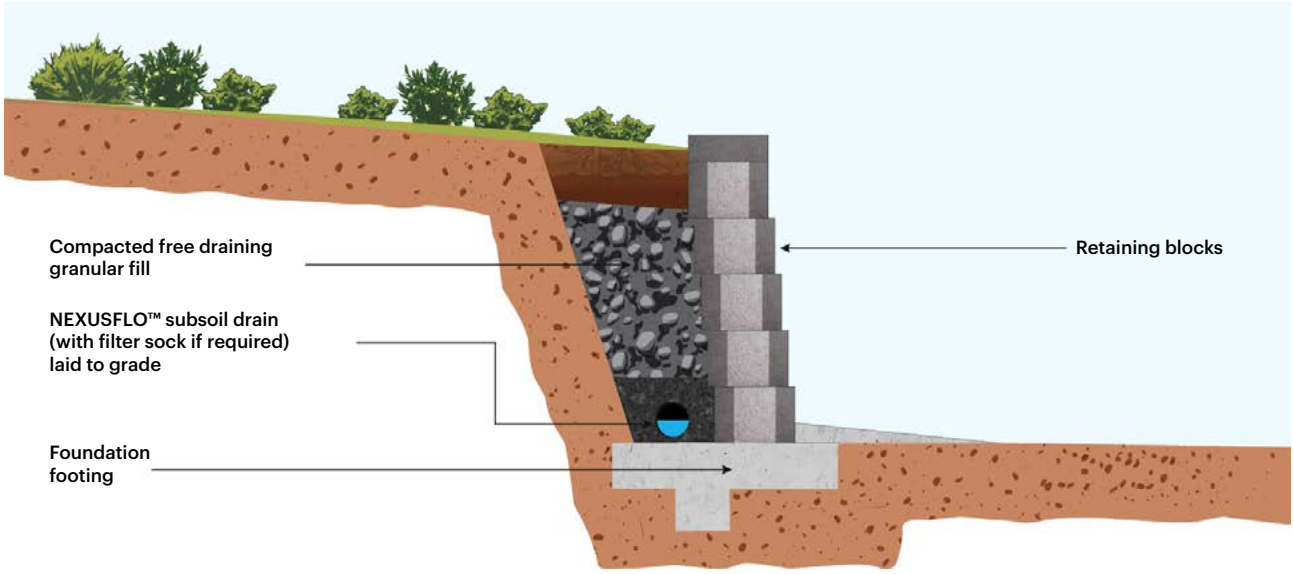



**NEXUSFLO™ crossing a farm raceway with thoroughly compacted aggregate surround and backfill**

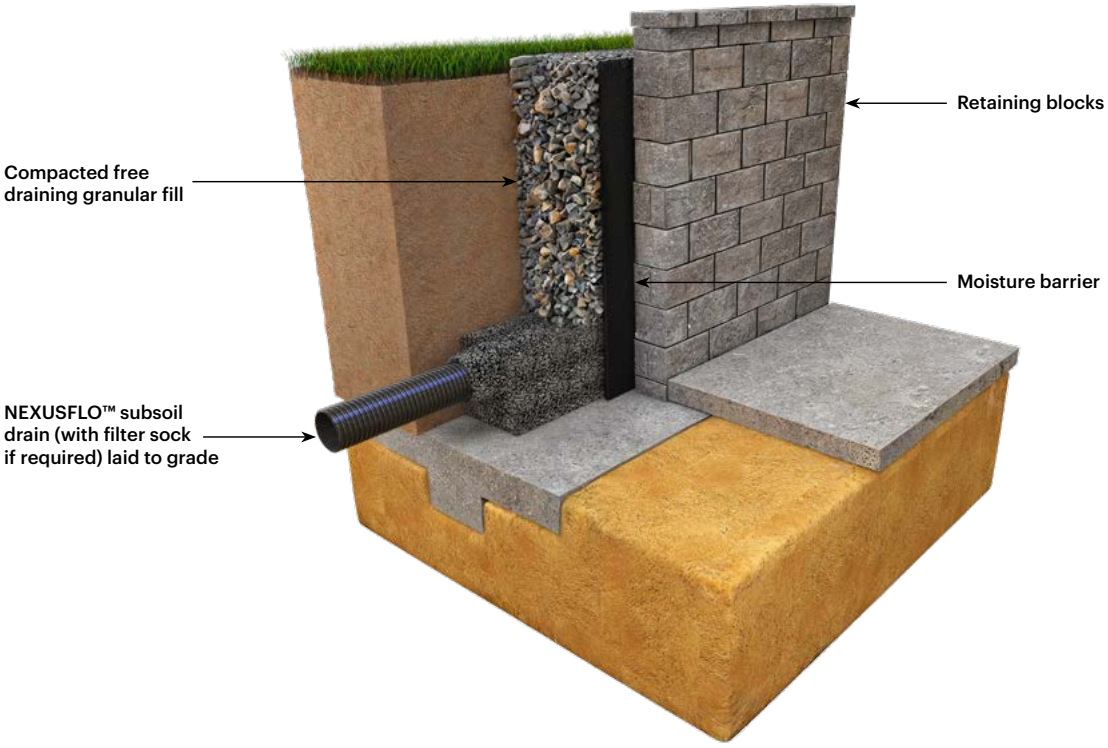
**NEXUSFLO™ under a sealed commercial road, surrounded by permiable aggregate backfill, thoroughly compacted to NZTA Standard**

# NEXUSFLO™ INSTALLATION FOR RETAINING WALL DRAINAGE

NEXUSFLO™ is recommended for subsoil drainage and fill stabilisation in foundations, underfloor drainage and behind retaining walls and ground retention structures. Nexus subsoil pipe intercepts the water table and flow of ground water behind the structure, and provides a pathway for the water to be effectively removed.



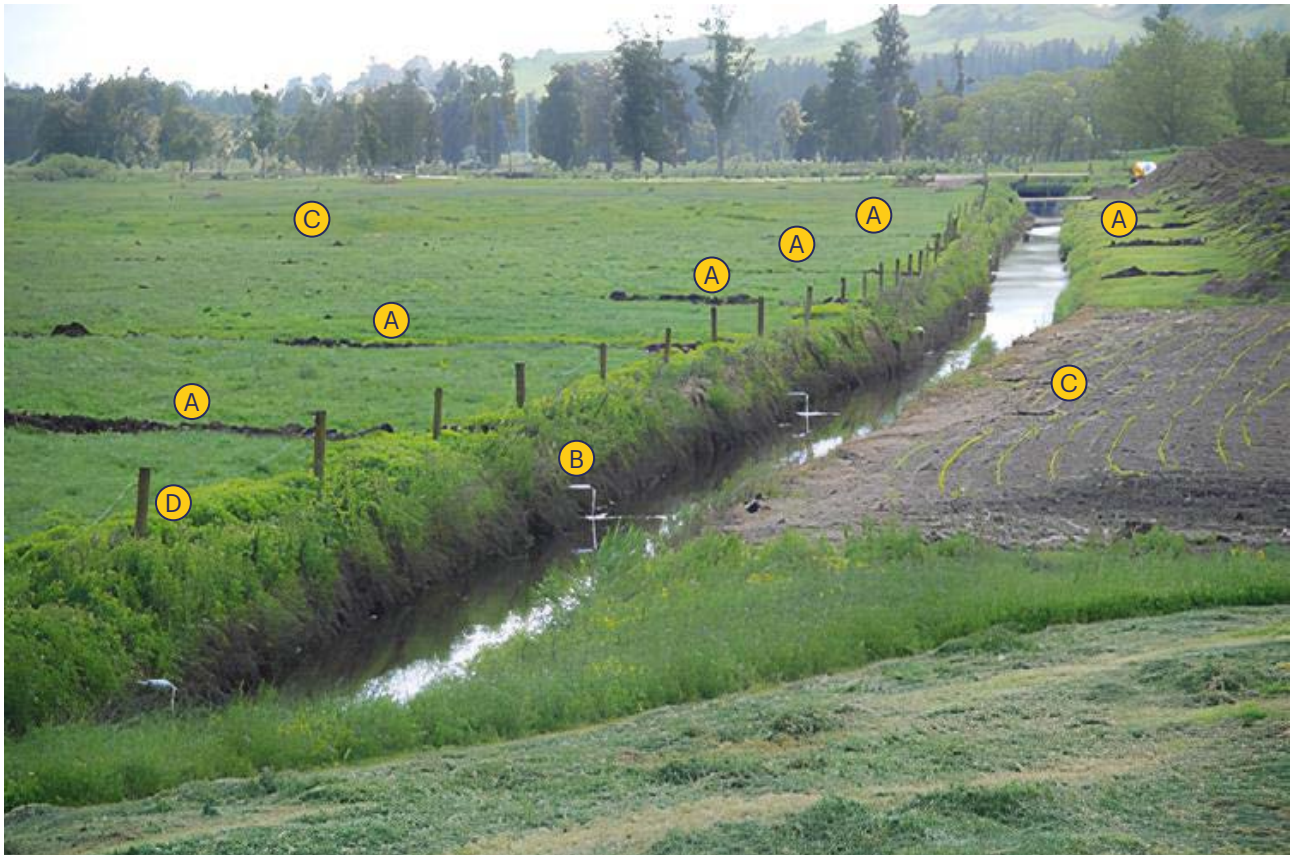

**Retaining wall - Cross section** *(Indicative only - not for detailed design)*




**Retaining wall** *(Indicative only - not for detailed design)*

# DRAIN OUTLETS

All drain outlets should be secure and protected from damage by stock or machinery. Check winter water levels to ensure your NEXUSFLO™ outlets are located above peak flood levels, and protected from back flow into the subsoil drain system. (Refer image below, showing NEXUSFLO™ drainage lines **(A)**, drain outlets **(B)**, drained land areas **(C)** with pasture and maize crop and fence protection from grazing stock **(D)**.




## DRAIN DISCHARGE ARRANGEMENTS

A short section of plain wall PVC-U stormwater pipe or culvert pipe, of the same OD as the NEXUSFLO™ pipe, can be added to the end of the NEXUSFLO™ subsoil drain. (See B above and right). This can prevent erosion of the ground around the outlet, and allow free discharge of excess soil water from the drain.

# IPLEX®
# QUALITY MANAGEMENT SYSTEMS

## Quality Assurance

Supplying products of consistently high quality is at the forefront of what we do at Iplex®, and central to our customer promise that Iplex® product quality meets or exceeds standards claimed.

All Iplex® manufacturing plants operate under a strict ISO 9001 Quality Management System (QMS). External certifying bodies carry out regular audits to provide third-party certification of the Company's QMS. Continued third-party product certification of Iplex® plastic pipeline products to relevant Australian & New Zealand standards, is also provided by these bodies.

The Iplex® laboratory is an IANZ accredited facility, providing added assurance that any measurement and testing is carried out professionally and in a technically reliable manner in accordance with international standards.

| APPLICABLE STANDARD | LICENCE TYPE | LICENCE NUMBER | CONFORMITY ASSESSMENT BODY |
|---|---|---|---|
| **ISO 9001:2015** | QMS Accreditation | QEC4169 | SAI Global |
| **ISO/IEC 17025:2017** | IANZ Accreditation | ACCREDITATION NUMBER 61 | IANZ |
| **BEST ENVIRONMENTAL PRACTICE-PVC** | BEP-PVC | BEP-PVC-0067 | ApprovalMark International |
| **AS/NZS 1254:2010** | StandardsMark™ | SMKP20126 & SMKP20180 | SAI Global |
| **AS/NZS 1260:2017** | StandardsMark™ | SMKP20184, SMKP20185 & SMK1305 | SAI Global |
| **AS/NZS 1260:2017** | WaterMark | WM 74530 | ApprovalMark International |
| **AS/NZS 1477:2017** | StandardsMark™ | SMK02569 & SMKP20181 | SAI Global |
| **AS/NZS 1477:2017** | WaterMark | WM 74868 | ApprovalMark International |
| **AS/NZS 4130:2018** | StandardsMark™ | SMKP20400 | SAI Global |
| **AS/NZS 4441:2017** | StandardsMark™ | SMKP20682 | SAI Global |
| **AS/NZS 4765:2017** | StandardsMark™ | SMK02570 | SAI Global |
| **AS/NZS 61386.21:2015** | S-Mark | LIC 2901 & LIC 2910 | Bureau Veritas |

# IPLEX® PIPELINES NZ
## THE COMPANY

Iplex® is one of New Zealand's leading manufacturers and suppliers of plastic pipeline systems. Iplex® provides products and services throughout New Zealand and to export markets around the Pacific and other international markets. Iplex® has manufacturing operations in Palmerston North, Christchurch and Ashburton, as well as access to the Iplex® Australia network. Iplex® New Zealand have been manufacturing plastic pipelines in New Zealand since 1962.

**Plumbing:** The Iplex® plumbing sector covers pipes and fittings used within the property boundary. This includes reticulation of potable and non-potable water, sanitary plumbing, wastewater, drainage and gas reticulation. Iplex® have the capabilities of supplying drain, waste and vent pipes and fittings, rainwater systems, traps and accessories.

**Civil:** Iplex® provides a wide range of solutions for wastewater, drainage and potable water pipeline projects. Manufacturing both PE (Polyethylene) & PVC (Polyvinylchloride) for both pressure and non-pressure (gravity fed) pipeline systems including civil infrastructure, drainage systems and roading systems.

Iplex® also services the following industry sectors:

**Energy and Communications:** an important sector for Iplex® NZ and there is a wide range of conduits, ducts and fittings available for new development and maintenance projects. The range covers electrical, communication and gas.

**Rural:** Iplex® also service the rural market providing pipes and fittings for rural use. Iplex® provide systems for irrigation, stock water, land drainage, culverts and farm dairy effluent.

*Iplex Pipelines manufacturing plant and distribution hub in Palmerston North, New Zealand*

# NOTES

# IPLEX NEXUSFLO® DESIGN AND INSTALLATION GUIDE
APRIL 2025

## LIMITATIONS

The information contained in this document is current as at April 2025 and is based on data available to Iplex® Pipelines NZ Ltd at the time of going to print.

All photographic images are intended to provide a general impression only, and should not be relied upon as an accurate example of Iplex® Pipelines NZ Ltd products, installed in accordance with this document or the referenced compliance documents.

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