Imperial College London

**Information & Communications Technology
Network Infrastructure Delivery**

Network Infrastructure Standards

**Appendix D
External Infrastructure Specification and Installation**

Version 1.6

Appendix D
External Infrastructure Specification and Installation

Introduction

This section details the required standards for External Infrastructure.

All buried ducting infrastructure shall be installed in strict accordance with NJUG National Joint Utilities Group guidelines and the College Estates specification.

This document will establish the requirements for the construction and installation of:

- Ducting
- Manholes and inspection pits
- Routes
- Duct Entry & Sealing
- Labelling
- Approved pre-formed chamber systems
- Installation & commissioning
- Using the infrastructure
- Maintenance and Business As Usual (BAU)

Ducting

The construction and installation of ducts will be as per the design drawings and must adhere to manufacturer's instructions and specifications.

All runs should be laid as straight as possible. If needed, you can carefully bend the ducts or use pre-formed bends.

The ducts must be laid and bedded in such a way as to prevent damage from rocks etc. within the trench or in the back-filling material.

All ducts must be provided with a nylon draw rope.

Duct will be purple in colour.

Where the duct enters the chamber, the duct shall enter flush with the wall.

Duct must not enter through corners and be no less than 75mm from the side wall.

Duct to enter wall 600 mm minimum depths from top of frame.

Duct to clear of base by 100mm minimum.

Ducts will enter the inspection pits using duct glands or have the holes pre-installed fi using the pre-formed manhole manufacturer.

The ducts will be sized in collaboration with network infrastructure delivery & estates teams. They will be sized to enable all services required on day one and to accommodate future strategy of the campus and buildings.

Manholes & Inspection pit

The construction and installation of manholes will be as per manufacturer's instructions and estates specifications, we will need to enable College and or third parties to effectively use them. This means that there needs to be available;

- Step irons.
- Cable routing/bearers.
- Bell mouths.
- Sump.
- Anchor iron.
- Cable glands on all ducts (or similar).

The sizing will be calculated depending on the number of ducts required for the run. And the above specifications can be reduced if the manhole/inspection pit is small enough not to necessitate parts of the requirement (for example: steps will not be needed if there is no way to get inside of the manhole.

Manhole covers and construction must be fully adequate to the environment they will be in. Meaning that the construction and the cover of a manhole in a footpath will have a different specification and construction from the ones in the highway or a road or access for heavy equipment.

All manhole covers will reflect their ownership/use.

ID A: "ICL ICT"

For all manhole covers that are dedicated to ICT cabling.

ID B: "ICL ICT/BT"

For all BT specified ducts and routes but owned by College.

All manholes will be geotagged information to be sent in electronic format as part of the handover documentation.

Routes

The construction and installation of ducting & manholes will be as per manufacturer's instructions and must comply with NJUG National Joint Utilities Group guidelines and the College Estates specification.

All buildings will have full resilient routes and dual entrance points as a minimum. The penetration of the ducts into the building will be into an intake room and the ducts must be adequately sealed.

All campuses will have multiple and resilient routes and dual entry points as a minimum. Four, at least, are advisable as the connectivity to the campus is done via third parties (Telco's) which may be limited in the area where they can enter the campus.

Duct Sealing

All building entry points shall be sealed with gas tight / vermin resistant propriety seals.

BT Chambers and ducts

BT chamber and duct specifications are excluded from these standards. BT External infrastructure

install to follow most current BT specifications for manholes and ducting.
BT routes are to be designed and maintained by College, manhole covers will carry chamber ID according to College standard and as described above.
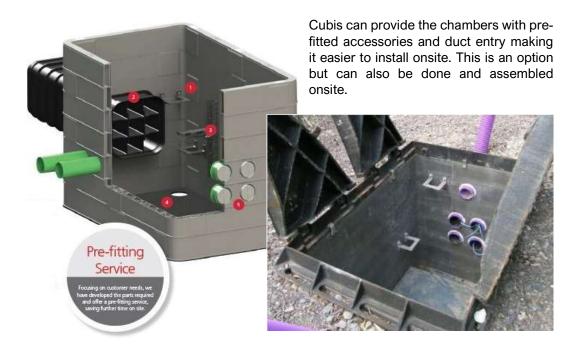

Cable labelling

Fibre cabling will be labelled with information required by the company providing the service to Imperial or third parties working within our estate.

It will be done in a labelling system that will withstand the harsh conditions of the external installation. The label needs to be attached and readable at any time during the lifetime of the cable and the responsibility to maintain so will be of the Telco or owner of the fibre.

The Imperial College own installations will follow the same rules as all others and the information to be included in the labels is as described in the cable installation standards appendix C.

Accepted pre-formed chamber systems

Cubis
http://www.cubis-systems.com/uk/

Cubis can provide the chambers with pre-fitted accessories and duct entry making it easier to install onsite. This is an option but can also be done and assembled onsite.

Detailed information:

http://www.cubis-systems.com/uk/products/large-chambers/ultima-connect/#main

http://www.cubis-systems.com/media/3335/stakkabox-ultima-connect-brochure.pdf

http://www.cubis-systems.com/media/3065/cubis-product-size-guide.pdf

Examples:

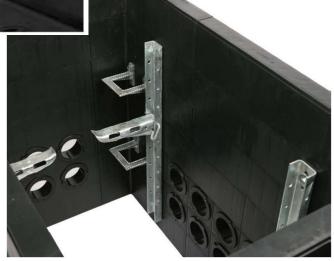https://youtu.be/BluVGrkuMig

https://youtu.be/yLc06JRIOmo

Clark
http://www.clark-drain.com

Detailed information:
http://www.clark-drain.com/products/
http://www.clark-drain.com/products/chamber-access-solutions/

Manufactured duct entries.

Accessories to be installed with an agreed pre-configuration and with duct entries made by manufacturer.

Construction and installation example.

All manufacturer specifications are to be followed on any, or all, of the systems. Both systems have comprehensive literature to enable an easy installation (which includes videos) and adequate to different types of requirement and location of installation.

Installation commissioning and use

ICT NID team will check the installation and pre-delivery of any such systems to ensure an adequate installation and the creation of the documentation needed to manage the infrastructure.

Any cost of associated with the commissioning will be passed on to the organisations that require the services to be installed.

New installations requests and wayleave

All service requests for installing new fibre optic cabling by telecommunications service providers shall be passed to ICT Network Infrastructure Delivery Team ictns-infra-dl@imperial.ac.uk for consideration and approval. Installation

ICT Network Infrastructure Delivery Team will liaise with Legal Services to agree on the acceptance of wayleave.

New installations are Permit to Work activity and RAMS are required to be submitted and approved prior to commencement of work by ICT and College Estates department.

Maintenance and Business As Usual (BAU)

Supervision and installation of the external ICT infrastructure is responsibility of the ICT.

Repair to any damage to the external infrastructure is responsibility of College Estates department.

Drawings

Please refer to Support Services Engineering Team CAD Strategy.

In addition to this all chambers to be geo tagged and the information included into the   drawings to be delivered to ICL.