Appendix E

Electronic As-Built Requirements

ELECTRONIC AS BUILT REQUIREMENTS

The following details the requirements necessary to ensure compatibility with Council's GIS System.

- **Format of Data File**
  Currently As-built data transfer from the CAD systems of surveyors or contractors to Council, involves data format change to MAPINFO format. Ideal format for data exported from AUTOCAD or other CAD system is the standard MAPINFO format (*.mid/*.mif). AUTOCAD and other systems do not currently support *.mid/*.mif format. MAPINFO then requires data to be in the format of DXF vers 12 or 13.

  REQUIREMENT 1: Format of Electronic As Built to be in *.MID/ *.MIF format or DXF version 12, 13.
  NB. If a CAD system is not used, plans must have co-ordinate information displayed for every point feature (including pipe bends).

- **Layer Problems**
  Currently many layers are exported from AutoCAD into DXF format, which is very difficult for GIS administrators at FDC to decipher. In order to establish some procedure, layers of data should be named standard names at time of creation.

  REQUIREMENT 2: Naming of data layers to be consistent, using the names listed in Table 1 (attached).

- **Linework**
  Linework depicting pipes should be standardised so that they are either ONE line or ONE polyline. Currently pipe linework is varying in its arrangements and we need to avoid the current problem of there being hundreds of pipe segments for As-builts that in actuality have perhaps 20 pipes.

  REQUIREMENT 3: Linework depicting pipes to be combined between single points. These points being *Manholes* for sewers, and *Nodes* for water pipes.

- **Node Creation**
  Where a pipe changes attribute (eg. pipe diameter or pipe type) there needs to be a Single Point allocated, being a pipe node.

  REQUIREMENT 4: Points where pipe attributes change need to be indicated with co-ordinate points for water and sewer pipe systems* and stored in the W_NODE or SS_NODE layer*.

It is enough for stormwater that the feature is marked with a point and put into the SW_POINTS layer.

- **Dual Indication of Point Features**
  Currently symbols when imported are made up of many lines and polygons. This is useless when converting the data to MAPINFO format. These symbols have to be removed and recreated in approximate centre of the symbol.

  We therefore require two forms of symbol for each feature. One symbol being a single point object for the purpose of importing the symbol in the exact location, the other symbol being of the currently provided type for the purpose of hard copy output.

REQUIREMENT 5: Point features be indicated with both a single point object, and as (currently given) linework symbols.in their respective layers

REQUIREMENT 6: As-built Plans must express the projection used for X and Y co-ordinates and also the datum used for Z co-ordinates (lid levels and invert levels).

REQUIREMENT 7: Engineering Drawings (ED) and As-built Plans for all Pipe Networks to be provided in both hard copy and digital format. For Water and Waste Water Pipe Networks FDC will then allocate internal (PAMS) numbers to point features and linework and return a copy of the ED to surveyor. As-built to be produced complete with FDC allocated numbers in hard copy and digital format. For Stormwater Pipe Networks, with requirement for surveyors to number As-built plans with FDC internal numbers.

Undecided:
Data possibly to be supplied directly to Council once a plan for As-built supply has been approved. Data transfer to involve transfer via email, floppy disk or CD with the file size being a determinant.

TABLE 1: REQUIRED LAYER NAMES FOR SURVEYORS

SEWER

LAYER CODE	INCLUDES	DATA TYPE
SS_MANHOLE	New Sewer Manholes	Single Point
SS_PUMP_STN	New Sewer Pump station	Single Point
SS_CONNECT	New House Connection Pipe	Linework
SS_NODE	New Pipe Connection Point (*or change in attribute*)	Single Point
SS_PIPE	New Sewer Pipes	Linework
SS_OTHER	New Other Sewer Features	Line/Point
EX_SS_POINTS	Existing Single Point Features	Single Point
EX_SS_LINES	Existing Linework Features	Linework
EX_SS_OTHER	Existing Other Sewer Features (eg. ponds)	Line/Point/Polygons

WATER

LAYER CODE	INCLUDES	DATA TYPE
W_NODE	New Pipe Connect Point (*or attribute change*)	Single Point
W_HYDRANT	New Fire Hydrant	Single Point
W_VALVE	New Valve (all varieties)	Single Point
W_PUMPSTATION	New Pumpstation	Single Point
W_PIPE	New Water Pipe	Linework
W_CONNECT	New Private Connection Pipe	Linework
W_SOURCE	New Water Source (eg. Spring)	Single Point
W_STORAGE_BDY	New Water Storage Facility	Single Point
W_OTHER	New Other Water Features	Line/Point
EX_W_POINTS	Existing Single Point Features	Single Point
EX_W_LINES	Existing Linework Features	Linework
EX_W_OTHER	Existing Other Water Features	Line/Point

STORMWATER

LAYER CODE	INCLUDES	DATA TYPE
SW_POINTS	All New Stormwater Point Features EXCEPT MANHOLES, including cesspits, inlet/outlet structures, floodgates	Single Point
SW_MH	All New SW Manholes	Single Point
SW_LINES	All New Stormwater linework, including pipes	Line work
SW_OTHER	All Other New Stormwater features, including ponds	Line work/Points

SW_OVERLAND	All new overland flow directional linework and insets (complete)	Linework/Points/ Text in insets.
EX_SW_POINTS	Existing SW Point Features (cesspits, inlet/outlet structures, floodgates)	Single Point
EX_SW_MH	Existing SW Manholes	Single Point
EX_SW_LINES	Existing SW Linework (pipes)	Linework
EX_SW_OVERLAND	All new overland flow directional linework and insets (complete)	Linework/Points/ Text in insets.
EX_OTHER	Existing Other Stormwater features (eg. ponds)	Line work/ Points/polygons

OTHER LAYERS

LAYER CODE	INCLUDES	DATA TYPE
TEXT	All Text on Asbuilt (EXCLUDING INSETS) including: road names, addresses, pipe attribute information, asbuilt reference information, co-ordinates, Projection information, legal description, dimension figures.	Text
SYMBOLS	Symbology currently provided (Manholes made up of 15 line segments etc., fire hydrants, valves, flow direction, pumpstations, cesspits, etc.)	Linework/ Polygons
CLOSEUP	Closeup diagrams, inclusive of ALL information in the diagrams	Linework, Points, Text, Polygon
PARCEL	Parcel Line work	Line work
OTHER	Trees, Buildings, Arrows, North pointer, scale bar, any other polygon not related to pipe networks.	Polygon/linework

"As-Built" Plan Check List

The "As-Built" Plan to be submitted by the Subdivider's Representative shall record the following information:-

a. The "Title Plan" boundaries, lot numbers, road names, and north point.

b. All sanitary sewers (coloured red), storm water and land drainage (coloured blue, including overland flow paths), water supply, ducting for power, telephone and gas, together with all relevant surface structures.

c. All stormwater and sanitary services, labelled as to:

   i. Manhole number and diameter if other than 1050 mm diameter
   ii. Direction of flow
   iii. Internal diameter of pipe (in mm)
   iv. Pipe material, PVC, RC, EW, CLS, etc
   v. Manhole lid level and invert levels
   vi. Manhole offset distances to nearest Lot boundaries

d. All water reticulation services, labelled as to:

   i. Internal diameter of pipe (in mm)
   ii. Pipe material, and class and/or type of main
   iii. Parallel distance of pipe from nearest Lot boundaries
   iv. Type and diameter of valves
   v. Fire hydrants and water meters
   vi. Position of bends, street crossings and fittings from nearest lot boundary.

e. All power and telecom ducts, labelled as to:

   i. Number of, diameter, and type of duct

f. Typical cross-section through the full road reserve width recording the following details:

   i. Seal type and thickness
   ii Metal layer type and thickness

In addition the plans submitted shall record the following:

g. A schedule of all storm water and sanitary sewer reticulation detailing manhole number, manhole co-ordinates, co-ordinates for branch line ends (where the branch is greater than five metres in length) and invert levels, including storm water inlet and outfall pipe ends or structures.

h. A schedule of all storm water and sanitary sewer lines detailing Lot number, distance of house connection from centreline of downstream manhole, distance perpendicular, and diameter of connection

i. A schedule of water "As-Builts" detailing type and co-ordinate of all values, and hydrants.

j. Certification by a Chartered Professional Engineer or Licenced Surveyor that the information supplied on the "As Built" is accurate within normal acceptable engineering and surveying tolerances. Council will accept "As Built" plans prepared by a person holding a NZ Certificate in Engineering and/or Surveying, provided the person is working under the direction of a Chartered Professional Engineer or Licenced Surveyor.

k. All "As Built" plans are to be drawn at 1:500 scale.

l. All co-ordinate information is to be in terms of geodetic datum 1949.

m. All reduced levels are to be in terms of an approved Lands and Survey level datum.

n. Such other details as may be required by the Appropriate Asset Manager.

NOTES:

1. Receipt of "As Built" plans and Council's acceptance thereof does not absolve the Subdivider from any responsibility for their inaccuracy.
2. In the event of a connection not being provided although shown on the "As Built" plan, or a connection not being in the position shown on the "As Built" plan, it shall be the responsibility of the Subdivider or their representative to locate or provide the connection for any purchaser of the Lot.