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1200 CONTRACTS AND DRAWINGS CHAPTER

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1210 GENERAL PROCEDURES

1210.01 INTRODUCTION

The preferred computer drafting program to be used by contractors for production of contract drawings for the Ministry of Transportation and Infrastructure is **AutoCAD®** by Autodesk®, Inc.

A minimum of one hard copy of the contract drawings will be supplied along with a USB memory stick or DVD containing a digital copy of all drawing files and referenced files required to fully view, edit and print the drawings.

The only acceptable drawing file formats are the **AutoCAD DWG/DXF** formats. Manually drafted drawings will no longer be produced for contracts.

AutoCAD is used by all ministry branches, regions and districts to facilitate:

- The development and maintenance of standards to ensure consistent drawing quality and integrity.
- The transfer of technical information within the ministry in a manner that simplifies and standardizes the manipulation of technical information by each branch.
- The development and maintenance of a record system to ensure accessibility and continuity.
- Interaction with other electronic geo-based systems (GIS, Civil 3D, etc.).

1210.02 GENERAL

AutoCAD provides the ability to draw in real world coordinates using real units of measure. Because of the linear nature of highway design, units must be carefully considered. All design drawings should be constructed with the metre as the drafting unit.

If possible, the entire project should be designed and drawn as a single “design drawing”. This drawing will contain all the necessary information required for each plan plate. Refer to [Section 1220.04](#). Working frames are then superimposed, overlapped and orientated to indicate the individual plan plates. At this point a great part of the drawing can be saved, with the appropriate name, as the key plan.

The usage of a single design drawing will promote consistency in the symbols, linetypes, colors, plot styles, layering, etc. in the project.

Each working frame becomes a viewport for the paper space layout for individual drawings. These layouts are used for final plotting of contract drawings and should be created without destroying or subdividing the larger design drawing.

1210.03 DATA STORAGE

File Names

Recommended file names use the region number and drawing sequence (assigned by the ministry) in addition to the drawing type (e.g. R1-185-100 for plans).

Archive

When the contract drawings are finalized and plotted for signature, the plot versions (e.g. PDF) of the drawings shall be archived to a USB memory stick or DVD (two sets). Both sets of the archive make up part of the contract and are property of the ministry. Project discs are labelled as follows:

Drawing Series Number (see section below)

Project Name:	Start Rd to End Creek
Consultant:	ABC Engineering
Disc Number:	x of y
Date	YYYY-MM-DD

In house designs will refer to the ministry designer in place of the consultant company name.

Ministry Designer: W. Smith

1210.04 NUMBERING OF DRAWINGS

Refer to Technical Circular T-5/93.

When a contract is issued for design, the drawings are assigned a designation number by the Senior Engineering Manager, Highway Design Services, or their designate.

The designation number is made up of the region number or name and a drawing series number.

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Note that the title page is never numbered. The complete format is as follows:

RR-NNN-nnn

Where RR is the region encompassing all or most of the project, NNN is the drawing series within that region and nnn is the sheet number within that series.

Example: R1-127-001

R1-127 is unique to the project and indicates Region 1 and drawing series 127. 001 indicates drawing #1 in this series. 001 is usually the key plan.

At present there are three regional designations: R1, R2, and NR. NR stands for Northern Region and is used in place of R3 to avoid duplicating previously used contract drawing numbers for another area of the province designated R3 prior to 2002.

Drawings sheets are numbered sequentially or in sequential groups throughout the project and are arranged in the general order as shown on the index. Depending on the type and complexity of the contract, some of these items may be combined or omitted entirely.

Traditional Sequential Method

Drawing numbers are sequential, leading zeros are omitted.

RR-NNN-1	Key Plan
RR-NNN-2 to 14	Plans
RR-NNN-15 to 25	Profiles
and so on...	

Sequential by Drawing Type Method

The sheet numbers may be grouped by drawing type. This allows drawings to be added or deleted without the need to re-sequence the entire project. The following sheet numbering system is suggested:

RR-NNN-001	Key Plan
RR-NNN-101 to 199	Plans
RR-NNN-201 to 299	Profiles
RR-NNN-301 to 399	Typical Sections
RR-NNN-401 to 499	Geometrics & Laning
and so on...	

1210.05 SIGNING OF DRAWINGS

Technical Circular T-2/93 has been replaced by the following procedure.

Title Blocks

Title blocks are limited to working drawings and will show only one signature block for the Engineer of Record whether for major projects, regional, or district contracts.

Contract drawings prepared by ministry staff or by consultants shall be signed and stamped by the Engineer of Record. Refer to [Figure 1210.C](#).

All contracts, 3 km or longer, will have a front page and a key plan page. The front page will have no title block and it will show the provincial logo, the ministry name, the project name and number and the name and title of the regional Executive Director or Chief Engineer (no signature).

The key plan page will show the ministry name, a location map, a key plan, the drawing index, the symbol legend (as appropriate), the contract details including contract type, number, location, length, etc. as well as the dated signatures of the regional Executive Director and a Director of Engineering.

Infrequently, the key plan may be signed by a Director of Engineering and the Chief Engineer.

For major projects, the Major Project Director will sign along with the Project Manager.

The key plan page signatures will be on either the full size or reduced title block as shown on [Figure 1210.A](#) or [Figure 1210.B](#).

For small contracts less than 3 km, the front page is not mandatory.

The signatures on the key plan signify acceptance for construction. The Engineer of Record signs and stamps the working drawings, assuring accuracy and content. These signatures are required for all projects regardless of length or size.

Digital Signatures

For electronic drawings, Engineers of Record are to use the digital signature and electronic sealing

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technology approved by Engineers and Geoscientists BC.

More information on the best practices in the use of electronic seals can be found at the Engineers and Geoscientists BC web site in the [Quality Management Guidelines: Use of Seal](#).

Use of the digital signature and electronic sealing is strongly encouraged, while it will still be acceptable to submit drawings that are hand stamped and signed.

Property Acquisition Plan (PAP)

Property acquisition plans shall be signed by the Engineer of Record which indicates the only meaningful review to ensure the accuracy of the proposed right-of-way.

Exception: PAP drawings for small trespasses and drainage easements on unnumbered routes and Section 42 acquisitions may be signed by the District Manager, Transportation.

Quality Control

The Design Manager for the project will, at the start of each major design phase, identify the person who will provide quality control of the technical content by reviewing and approving each stage.

Issuing of Drawings for Tender

Refer also to Technical Circular T-11/06

One complete set of full size drawings, signed and stamped by the Engineer of Record (consultant or ministry), with the appropriate ministry official's signatures on the key plan, may be sent to the Queen's Printer. These drawings will be scanned to produce the electronic PDF files for posting on the BC Bid website.

Queen's Printer will print the full-size and half-size drawings for distribution to courtesy plan holders and for tender document sales. Local printers may also be used to produce the electronic PDF files and contract administration offices would then post them on the BC Bid website and make them available to Queen's Printer for printing.

As per the policy in the Contract Administration Manual, the signed and stamped tender drawings will be used for the contract award. Therefore, these drawings shall **not** be annotated as "Issued for Tender" or "Issued for Construction".


For scanning and copying purposes, ink stamps must be used. Embossed seals are not acceptable.

Engineering drawings issued for tender, that have not been signed and sealed, must be authorized for use by the regional Executive Director or Branch Director and the drawings must be labelled "Preliminary Not for Construction" prior to posting on the BC Bid website.

1210.06 AMENDED DRAWINGS

1. Once a project drawing has been approved by either the regional Executive Director or the Chief Engineer, any further alterations or amendments must be recorded in the revision space provided. Revised drawings must be signed and stamped by the Engineer of Record.
2. A major revision which completely alters the intent of the original approved drawing must be re-approved. (i.e. signatures of the Engineer of Record, Director of Engineering, and regional Executive Director).
3. If an approved project plan is amended, either the original or seven prints are to be submitted to the Regional Property Agent.
4. When a project plan drawing is amended to show R/W as purchased, do not remove the original boundary or area. Show the amended R/W boundary with a heavier line and note the increase or decrease in area.

FIGURE 1210.A TITLE BLOCK FOR MAJOR PROJECTS KEY PLAN

 <div> <div>BRITISH COLUMBIA</div> <div>MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE</div> <div>NOTE 1 NOTE 1</div> </div>		<div>REGION OR DISTRICT MAP</div>
NOTE 2		
<div>PROJECT MANAGER</div> <div>DATE YYYY-MM-DD</div>	<div>PROJECT DIRECTOR</div> <div>DATE YYYY-MM-DD</div>	<div>PROJECT NUMBER</div> <div>REG R1</div> <div>DRAWING NUMBER</div> <div>REV A</div>
NOTE 5	NOTE 6	NOTE 7

FULL SIZE TITLE BLOCK

NOTE 3	NOTE 4
<div>PROJECT MANAGER</div> <div>DATE YYYY-MM-DD</div>	<div>PROJECT DIRECTOR</div> <div>DATE YYYY-MM-DD</div>

(signature boxes are centred at the bottom of the sheet)

<div>(standard lower right location)</div> <div>DRAWING NUMBER</div> <div>REV A</div>
NOTE 7


REDUCED VERSION OF TITLE BLOCK (ALTERNATE)

NOTES:

- MAJOR PROJECT NAME
- SUB-PROJECT / DESCRIPTIVE NAME AND SPECIFIC DRAWING INFORMATION
The sub-project / descriptive name must be listed on all drawings and all correspondence
- PROJECT MANAGER'S SIGNATURE
The project manager signs for acceptance of the design work on behalf of the ministry
- PROJECT DIRECTOR'S SIGNATURE
The project director signs to authorize the use of the design work for the major project
- THE MINISTRY OR CONSULTANT CORRESPONDENCE FILE NUMBER
The heading should be changed to identify ownership of the file number
Examples: MINISTRY FILE NUMBER, CONSULTANT FILE NUMBER
- PROJECT NUMBER
- PROJECT DRAWING NUMBERS USED FOR DRAWING CONTROL AND TRACKING

THE FULL SIZE TITLE BLOCK IS NORMALLY USED. THE REDUCED VERSION IS AN ALTERNATIVE. SEE SAMPLE DRAWINGS.

FIGURE 1210.B TITLE BLOCK FOR REGION/DISTRICT KEY PLAN

 MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE NOTE 1 NOTE 1		REGION OR DISTRICT MAP
NOTE 2		
EXECUTIVE DIRECTOR, SOUTHERN INTERIOR REGION		REV
DIRECTOR, ENGINEERING	DATE YYYY-MM-DD	DRAWING NUMBER
FILE NUMBER	PROJECT NUMBER	REG
NOTE 5	NOTE 6	R1
		NOTE 7
		A

FULL SIZE TITLE BLOCK

NOTE 3	NOTE 4
DIRECTOR, ENGINEERING	EXECUTIVE DIRECTOR, SOUTH COAST REGION
DATE YYYY-MM-DD	DATE YYYY-MM-DD

(signature boxes are centred at the bottom of the sheet)

(standard lower right location)	
DRAWING NUMBER	REV
NOTE 7	A

REDUCED VERSION OF TITLE BLOCK (ALTERNATE)



NOTES:

1. REGION OR DISTRICT NAME
2. PROJECT NAME AND SPECIFIC DRAWING INFORMATION
The project name must be listed on all drawings and all correspondence
3. DIRECTOR, ENGINEERING'S SIGNATURE
This will be a Director of any engineering discipline, or their delegate, that works in the Regional office where the project design is being done.
4. REGIONAL EXECUTIVE DIRECTOR'S SIGNATURE
5. THE REGION, DISTRICT OR CONSULTANT CORRESPONDENCE FILE NUMBER
The heading should be changed to identify ownership of the file number
Examples: DISTRICT FILE NUMBER, CONSULTANT FILE NUMBER
6. PROJECT NUMBER
7. PROJECT DRAWING NUMBERS USED FOR DRAWING CONTROL AND TRACKING

THE FULL SIZE TITLE BLOCK IS NORMALLY USED. THE REDUCED VERSION IS AN ALTERNATIVE. SEE SAMPLE DRAWINGS.

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FIGURE 1210.C TITLE BLOCK FOR DRAWINGS

 BRITISH COLUMBIA MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE NOTE 1 NOTE 1		REGION OR DISTRICT MAP	
NOTE 7 SCALE 0 0.5 1:50 2.5m CAD FILENAME _____ DATE _____ YYY-MM-DD		NOTE 2	
REVISIONS NOTE 10		NOTE 3 & 8 	
SIGNATURE NOTE 9		DESIGNED _____ DATE _____ 2010-03-31 QUALITY CONTROL _____ BOB JOHNSON DATE _____ 2010-03-31 QUALITY ASSURANCE _____ JOHN SMITH DATE _____ 2010-03-31 DRAWN _____ C. WILLIAMSON DATE _____ 2010-03-31	
ENGINEER OF RECORD DATE _____ YYY-MM-DD FILE NUMBER		PROJECT NUMBER NOTE 5	
NOTE 4		REG R1	
		REV A	

NOTES:

1. REGION, DISTRICT, BRANCH OR MAJOR PROJECT NAME
2. PROJECT NAME AND SPECIFIC DRAWING INFORMATION
The project name must be listed on all drawings and all correspondence.
3. ENGINEER OF RECORD'S SIGNATURE AND STAMP GOES HERE
The Engineer of Record signature is for contract drawings prepared by ministry staff or consultants.
4. THE HEADQUARTERS, REGION, DISTRICT OR CONSULTANT CORRESPONDENCE FILE NUMBER
The heading should be changed to identify ownership of the file number
Examples: DISTRICT FILE NUMBER, CONSULTANT FILE NUMBER
5. PROJECT NUMBER
6. PROJECT DRAWING NUMBERS USED FOR DRAWING CONTROL AND TRACKING
7. CONSULTANT AND PARTNER LOGOS MAY BE ADDED HERE
8. REVISIONS MUST BE SIGNED AND STAMPED BY THE ENGINEER OF RECORD
9. PERSON'S FIRST INITIAL (minimum) AND COMPLETE LAST NAME
10. "ISSUED FOR TENDER" OR "ISSUED FOR CONSTRUCTION" SHALL NOT BE ANNOTATED ON ANY TENDER DRAWINGS

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1220 CONTRACT DRAWINGS

1220.01 FRONT PAGE

Sample [Figure 1220.A](#)

This page will have the provincial logo, ministry name, project number, project name and will indicate the name and title of the Chief Engineer or the regional Executive Director (no signatures).

Large projects (discretionary ≥ 3 km) will have a separate front page, not numbered, with the name and title of the Chief Engineer or regional Executive Director (no signature). For smaller projects (discretionary) there is no requirement for a front page.

1220.02 KEY PLAN

Sample [Figure 1220.B](#)

The designer has the option of using the full size title block or the reduced version. See Figures [1210.A](#) and [1210.B](#). In the reduced version, the Drawing Number and Revision remain at the lower right and the signatures are moved to the center.

Key Plan Page Contents

This page shall contain the following information, appropriate to the scope and scale of the project.

1. A large scale location map showing:
 - Highway route(s) and city/town name(s)
 - Location of project
 - North arrow (preferably oriented upwards)
2. A key plan schematic drawing showing:
 - North arrow oriented to the location map
 - Scale
 - Sufficient cadastral mapping for orientation
 - City/town boundaries for reference, land districts, ranges, section lines, street names
 - Borders depicting mapping sheet coverage and layout
 - The proposed design location line for the main line with the beginning and end stations labelled LIMIT OF CONSTRUCTION
 - The proposed design L-lines for any frontage or service roads with their appropriate LOC stations (if applicable)

3. A legend (if it is a small enough project) showing standard symbols/linetypes representing components on the drawings. Sections [1250](#) and [1260](#) show the detailed definitions. Legend symbols and linetypes shall be scaled at 1:1.

4. Additional survey information may be shown. Examples:

- Survey control points table
- Survey control origin, scale factor
- Ground or UTM
- Data sources and quality
- Railways, lakes, rivers

5. A title showing:

PROVINCE OF BRITISH COLUMBIA
 MINISTRY NAME
 PROJECT NUMBER
 HIGHWAY NAME & NUMBER - GENERAL LOCATION
 PROJECT NAME
 CONTRACT TYPE
 PROJECT LIMITS
 STA. X+XX.XXX - STA. X+XX.XXX
 LKI: SEG. XXXX
 km XXXX TO km XXXX

Contract types are paving, grading, etc. Project limits are defined by road names, chainage, etc. See sample drawing for exact format.

6. An index showing the following (as applicable):

RN-nnn-001	Key Plan
RN-nnn-002	Legend
RN-nnn-101 to 1xx	Plans
RN-nnn-201 to 2xx	Profiles
RN-nnn-301 to 3xx	Typical Sections
RN-nnn-401 to 4xx	Geometrics and Laning
RN-nnn-501 to 5xx	Spot Elevations
RN-nnn-601 to 6xx	Signing & Pavement Markings
RN-nnn-701 to 7xx	Drainage
RN-nnn-801 to 8xx	Volume Overhaul Diagram
RN-nnn-901 to 9xx	Gravel Quantity and Haul Chart
<i>various numbering</i> All other drawings (*)	

* Bridge, Geotechnical, Electrical & Lighting, etc.

The key plan is signed by the regional Executive Director and Director of Engineering or the Chief Engineer. These signatures indicate acceptance for construction. (Refer to [Section 1210.05](#))

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1220.03 LEGEND

Sample [Figure 1220.C](#)

Large projects may have one page exclusively for the legend. All symbols, linetypes and any other unique features are listed on this page. Include a standard title block as shown in the sample figure.

1220.04 PLAN PLATES

Sample [Figure 1220.D](#)

Project chainage will run left to right with the north arrow pointing up. If a compromise is required, the North arrow orientation may be altered.

The plan drawing series shall be cross referenced to any required geometrics and laning, drainage, utility, spot elevation and profile series drawings. All cross reference boxes shall be in a clear area of the drawing and should generally conform to the sample drawing layout.

Plan Plates Information

Base Information (Screened or Masked)

AutoCAD methods for screening and masking are discussed in [Section 1240.13](#).

- Mapping at a scale appropriate to the type of work: 1:250, 1:500 and 1:1000 are the standards. See [Section 1260.07](#) for contour interval standards.
- Accurate representation of all existing buildings, utilities (aerial and underground), accesses, drainage structures and courses, fences, road surfaces and shoulders.
- Current legal descriptions and lot lines for all plans, easements, etc. within the project – also city/town boundaries, land district, ranges, sections and district lots, Indian Reserves, parks, railways, etc.

All are shown with their standard symbols and linetypes (refer to Sections [1250](#) and [1260](#)).

All field information that represents BCLS data should be shown in accordance with symbols and abbreviations which have been approved by the Surveyor General (see [Section 1250.02](#)).

Title Blocks Surveyed by:
Survey date:
Office processed by:

Refer to Section 600.04, General Survey Guide.

All Relevant P-Line Information

- Identification: i.e. "P100", PIs, POTs and stations
- Bearings between PIs or POTs
- Ties between P-line PIs or POTs and cadastral survey points (i.e., iron pins or monuments) showing bearings and distances

Design L-Line Information

- The glossary of terms in the Major Works Construction Agreement, defines the LIMIT OF CONSTRUCTION as the geographic limits of the project. The beginning and end of a project plus the extent of all sides shall be so called.
- Limits of construction on the primary L-line with stations
- Limits of construction on the secondary L-line with stations
- Numerical identification placed close to all L-lines, eg. 'L500'
- Labelling of all horizontal control stations, ex:

PI or L100A1-PI	Point of Intersection
POT	Point on Tangent
POC	Point on Curve
POS	Point on Spiral
BC	Beginning of Curve
EC	End of Curve
TS	Tangent to Spiral
SC	Spiral to Curve
PCC	Point of Compound Curvature
CC	Curve to Curve
CS	Curve to Spiral
SS	Spiral to Spiral
ST	Spiral to Tangent
STS	Spiral Tangent Spiral
SCS	Spiral Curve Spiral

- Identification of any intersecting L-lines thus:
POT 124+12.571 =
POT 505+00.000

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- Label stations that define structures, i.e., bridge abutment stations.
- Station ticks at 20 m intervals, annotated at 100 m intervals
- Azimuth indicated on tangents only on P-lines and L-lines, shown thus: 00°00'00"

Horizontal curve data shall be shown opposite the PI and internal to the curve where possible.

Horizontal Curve Data for Simple Curves

R	Radius of curve (with direction *)
Δ	Delta (intersection) angle
AD	Tangential distance (PI to BC or EC)
ARC	Arc length of curve
Ec	External distance (PI to curve)

Horizontal Curve Data for Spiralled Curves

R	Radius of curve (with direction *)
Δ	Delta angle of the entire curve incl. spirals
Δc	Delta angle of the circular curve portion
AD	Tangential distance (PI to TS/ST **)
ARC	Arc length of circular curve (SC to CS)
Es	External distance (PI to curve)

* Curve direction shown with an "LT" or "RT" suffix

** Unequal spirals show AD₁ and AD₂ (PI-TS/PI-ST)

The spiral information shall be shown internal to the spiral between the (TS/SC and CS/ST) thus:

Ls	Length of spiral
θ_s	Spiral angle

Compound curve data location is at the discretion of the designer as long as the information is complete.

Compound curve data is separated into two blocks: R₁, Δ , Δc_1 , AD₁, ARC₁ and R₂, Δc_2 , AD₂, ARC₂.

Include the PI station with the curve data in complex designs with numerous alignments/curves.

Other

The following elements shall be shown on the plan drawings to fully indicate the impact of the design:

- Geotechnical test holes (if available)
- The proposed edge of pavement drawn with a 0.50mm pen and clearly labelled

- Top of Cut (TOC) and Base of Fill (BOF) drawn with the standard line patterns; their transition point shall be labelled C/F or F/C
- Removals of existing infrastructure shall be clearly labelled. This includes all utilities such as hydro, gas, water, telephone and sewer, as well as curbs, barrier, pavement, sidewalks, drainage structures, and services such as underground storage tanks. When an existing fence is affected, clearly label the start and end of the affected section(s) as well as the type of fence.

R/W requirements for the project shall be laid out on a separate set of Property Acquisition Plans. These drawings shall have the same number as their plan counterpart but with an "RW" suffix.

The only exception to the requirement for separate R/W plans will be for small projects (1-2 plan sheets) and only with approval from the Regional Properties Branch (see [Section 1220.11](#)).

Clearing and grubbing areas shall be listed to four decimal places, indicated on the plan sheets only, and summarized in a boxed note as "CL. and GR. total this sheet x.xxxx ha". Individual areas shall also be outlined in a box.

Clearing and grubbing limits, if not coincidental with the R/W, shall be shown with the standard line pattern, annotated as "Clearing and Grubbing Limit" (or "Cl & Gr" if space is limited). These boundaries shall be established following the same criteria as the R/W boundary (see [Section 1220.11](#)).

Signing and pavement markings shall be indicated on a separate set of drawings.

A schematic layout of the plan sheets shall be shown on each drawing with the specific sheet highlighted to show its position in the project.

1220.05 PROFILES

Sample [Figure 1220.E](#)

Profiles shall be developed for all L-line traverses in a manner that portrays vertical as well as horizontal alignments.

All L-line profiles shall be at 1:2000/1:200 H/V. An appropriate scale for a secondary/frontage road could be 1:1000/1:100 H/V. Multiple profiles may be drawn on a sheet as long as they remain individual

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entities. **Urban Design** profile scale is 1:250/1:50 H/V.

The K value shall be entered on all profiles for each curve. Asymmetrical vertical curves shall indicate the K value for each half plus the applicable lengths of vertical curve: VC (total), VC1 and VC2.

Design speed of the proposed road shall be shown on the profile in a boxed note. In the case of multiple zones, the note must include a starting station. Multiple design profiles will have individual design speed notations.

Existing utility crossings, new culvert crossings, benchmarks, drainage, construction notes, quantities and etcetera are also included.

Project quantities shall be shown across the top of the profile. Items shown are project specific, some examples are: excavation, embankment, stripping, SGSB depth, hog fuel depth, side slopes, etc.

Profiles that run parallel to, or cross the main L-line, shall be referenced to the main line in order to easily locate their position on the plan sheets.

The horizontal alignment shall be shown symbolically and TO SCALE on the bottom of the profile. Azimuths will be shown for all tangents sections. Curves will be shown as offset straight lines. Spirals are sloped lines between tangent and curve. Station of transition points (BC/EC or TS/SC, CS/ST) shall be shown, as well as the radius, with direction (LT or RT), design curve maximum super elevation and a separate diagram showing left/right super elevation values at key transition points.

1220.06 TYPICAL SECTIONS

Sample Figures [1220.F](#) and [1220.G](#)

The typical section drawing(s) shall show all aspects of the template criteria relating to all the road classifications within the project. Most of this information is currently defined within Section 430, 440 and 450. However, as a result of site specific anomalies, approved variations to the standard are occasionally warranted.

The sections shall be developed at a scale that allows the viewer to assimilate the data without question. If a section is too long to be shown in its entirety, it should be broken rather than drawn 'not to scale'. If

there are variable scales involved on a sheet, bar scales shall be shown near each section and 'as shown' shall be labelled in the scale box.

The designer should not place template section information on other drawings. It is more effective to cross reference to a drawing specifically designated for the purpose.

Every effort should be made to maintain continuity of information. For example, enlarged detail should be shown relative to its main section.

1220.07 GEOMETRICS AND LANING

Sample Figure [1220.H](#) and [1220.I](#)

Geometrics and laning drawings shall include a north arrow and grid points correctly aligned, with sufficient latitude (northing) & departure (easting) labels for orientation.

Required Design L-line Information

- Secondary L-line LIMIT OF CONSTRUCTION with stations
- Numerical labels near all L-lines, i.e. 'L500'
- Street names
- Labelling of all horiz. control stations, such as:

PI or L100A1-PI	Point of Intersection
POT	Point on Tangent
POC	Point on Curve
POS	Point on Spiral
BC	Beginning of Curve
EC	End of Curve
TS	Tangent to Spiral
SC	Spiral to Curve
PCC	Point of Compound Curvature
CC	Curve to Curve
CS	Curve to Spiral
SS	Spiral to Spiral
ST	Spiral to Tangent
STS	Spiral Tangent Spiral
SCS	Spiral Curve Spiral

- Identification of any intersecting L-lines thus:

$$\text{POT } 124+12.571 =$$

$$\text{POT } 505+00.000$$

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- Label stations that define structures, i.e. bridge abutments stations
- Station ticks at 20 m intervals, annotated at 100m intervals
- Coordinates for: limits of construction, PI's and L-line intersections

Horizontal curve data shall be shown opposite the PI and internal to the curve where possible.

Horizontal Curve Data for Simple Curves

R	Radius of curvature (with direction *)
Δ	Delta (intersection) angle
AD	Tangential distance (PI to BC or EC)
ARC	Arc length of curve
Ec	External distance (PI to curve)

The horizontal curve information for frontage bulbs and intersections shall be referenced and tabled as shown in sample [Figure 1220.I](#)

Horizontal Curve Data for Spiralled Curves

R	Radius of curvature (with direction *)
Δ	Delta angle of the entire curve incl. spirals
Δc	Delta angle of the circular curve portion
AD	Tangential distance (PI to TS or ST **)
ARC	Arc length of circular curve (SC to CS)
Es	External distance (PI to curve)

* Curve direction shown with an "LT" or "RT" suffix

** Unequal spirals show AD₁ and AD₂ (PI-TS/PI-ST)

The spiral information shall be shown internal to the spiral between the (TS/SC and CS/ST) thus:

Ls	Length of spiral
θ_s	Spiral angle

Compound curve data location is at the discretion of the designer as long as the data is complete.

Compound curve data is separated into two blocks: R₁, Δ , Δc_1 , AD₁, ARC₁ and R₂, Δc_2 , AD₂, ARC₂.

Laning

Include all applicable laning lines as depicted on the sample drawing. This should include shoulder, pavement and lane edges, paint lines, gores, crosswalks and stop lines.

AutoCAD's PSLTSCALE variable should be set to 1 to ensure the plotted dimensions of the linetype

patterns (defined in [Section 1250](#)) are maintained regardless of the layout viewport plot scale.

Other Design Details

- Median and lane tapers, additional lanes, barrier flares, bus bays and drainage curbs labelled with their applicable start/end stations
- Sufficient annotation of lane and offset dimensions to clearly define the layout
- Design speed, design vehicle
- Standard symbols and linetypes to define concrete curb and gutter, extruded curb, median and roadside barrier, barrier terminus treatments and structural walls
- Join or match lines, where applicable, with notation of adjoining sheet
- Geometric and Laning series drawings shall be cross-referenced to their Drainage and Spot Elevation series counterparts.
- Arrows indicating direction of travel shall be **hollow**. **Solid arrows** shall only be used on signing and pavement marking drawings as an indication of where and what to paint.

1220.08 SPOT ELEVATIONS

Sample [Figure 1220.J](#)

Spot elevations are required at all L-line intersections with minor and major roads and at all interchanges. Accesses are excluded unless the tie to existing ground is more than 5 m from the normal highway pavement edge. Straightforward, simple spot elevations may be shown on laning and geometric drawings. If the spot elevation requirements are too extensive, a separate set of drawings should be used.

Spot elevations shall be shown in any area where the finished grade and shoulders are not defined by the normal roadway template, superelevation or cross fall rates. Such areas are acceleration and deceleration ramps, tapers, intersection radii and where a new design matches to an existing facility.

For curb and gutter projects, the elevations shall be shown where the asphalt and concrete curb meet.

The increment spacing for spot elevations is left to the designer's discretion. However, 20 m is the

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maximum with the desirable being a maximum of 10 m at intersections and locations where drainage may prove complicated.

Spot elevations shall be listed to three decimal places. The actual elevation point may be defined with a leader line or marker. Complex spot elevation drawings may use a numbered table format, listing the northing, easting and elevation.

A profile of a travelled edge, as experienced by a driver, is a useful tool for establishing accurate spot elevations.

Spot elevation series drawings shall be cross-referenced to their geometrics and laning, drainage and utility series counterparts.

1220.09 SIGNING AND PAVEMENT MARKINGS

Sample [Figure 1220.K](#)

Signing and pavement marking drawings are to be consolidated on a separate set of drawings. **This is intended to be a set of drawings for the use of pavement marking and signing crews.**

Proposed luminaire pole positions must be shown on this drawing. The only signs and luminaires indicated on any of the other drawings will be existing detail on plan sheets.

Reference manuals for signs & pavement markings:

- Manual of Standard Traffic Signs and Pavement Markings
- Pedestrian Crossing Control Manual for British Columbia

The location of both existing and proposed signs shall be shown with the appropriate symbols as listed in [Section 1250.10](#).

These symbols shall represent both existing and proposed appliances. Cross-reference to specialty drawings where special traffic appliances may be required.

All arrows indicating direction of travel shall be **solid arrows** and shall be shown at the actual locations where the arrows are to be painted.

Pavement marking drawings must be drawn to scale (1:500 or 1:250 only).

Refer to text height conventions in Sections [1240.07](#) and [1240.08](#) for the text height to accompany signs.

1220.10 DRAINAGE AND/OR UTILITIES

Sample [Figure 1220.L](#)

Drainage and/or utilities drawings shall include a correctly oriented north arrow.

These drawings should clearly portray the drainage / utility design against a screened background of geometrics and laning (see [Section 1240.13](#)).

Existing drainage / utility information shall be shown on these drawings, depicted with standard linetypes and annotated (see [Section 1260](#)).

Aside from the laning, the only geometric information required on these drawings is the reference grid, line designations, station ticks with annotation every 100 m and L-line control points depicted with a circle symbol.

A complex drainage and utility design may require separation into two individual drawings for clarity.

The open and closed drainage system (or utility) designs shall be depicted with the appropriate symbols as shown in [Section 1250](#). Such symbols and general layout procedures shall generally conform to the ministry sample drawing. A benchmark, for the designer, for determining the acceptability of the drawings, is to critique them from a construction contractor's perspective for completeness of information.

Design detail from a separate drawing, that might impact the drainage or utility systems, should be shown in order to alleviate any conflicts. Examples of such details are: special ground treatments (densification), structures (luminaires and sign footings, walls, bridge piers, etc.), utilities or drainage.

Drainage and/or utility series drawings shall be cross-referenced to the utility, drainage, geometrics & laning and spot elevation counterparts.

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1220.11 PROPERTY ACQUISITION PLANS

Samples Figure [1220.M](#) and [1220.N](#)

As a result of the current legislation governing the acquisition of property for highway construction, it is frequently necessary to initiate negotiations well in advance of project tendering. A set of drawings depicting project R/W requirements is essential to the property acquisition group's ability to proceed.

The Property Acquisition Plan will become the basis for (1) the appraiser to estimate the loss in value for the land required, and (2) for the ministry's representative and the property owner to understand the disturbances and impacts to the property from the taking. This includes any reduction in value to the remainder of the property.

This set of drawings is produced by making duplicates or prints of the project plan plates after the L-line has been established/added. It is desirable to turn off or remove the contours, clearing and grubbing and proposed edge of new pavement lines allowing the R/W drawings to become more legible, especially in urban drawings. Drawings are labelled "Property Acquisition Plan" as a separate note or in the title block, as applicable.

A good liaison with the Property Services Branch is required throughout the design process due to the complexity of property negotiations.

The acquisition plans are a standalone set. Once signed, no revisions are necessary as the design evolves unless there is a direct impact on the R/W requirements. See [Section 1210.06](#) and farther on in [Section 1220.11](#) for further instructions.

Definitions

The ministry and its representatives, while in the process of designing facilities for highway purposes, shall define a requirement to procure titled lands. This procurement may be either temporary or permanent in nature, and may be from either private or publicly held lands. The designer shall additionally define any requirement to procure municipal road areas.

Temporary constitutes a "license" of some type (LTC – License to Construct), and permanent could constitute Statutory Rights-of-Way (SRW) or an acquisition of property in "fee simple" (i.e. ownership).

Statutory Rights-of-Way (SRW)

An SRW grants an interest in the land, but no title. It is for a specific use of the land and is registrable. Registrable SRW's are documents filed as charges against the title of the land in the Land Title Office. It is worded to ensure permanent, continuous entry, egress, passage, installation and maintenance on exactly defined portions of privately owned lands for ministry purposes (e.g. drainage, landscaping).

Leases

A lease is an arrangement where the titleholder grants an interest to another person or party. It is for a definite term and it is registrable.

Licenses

Licenses give the ministry the right to work on private lands for the duration of the project only. For example, the installation of a retaining wall on the R/W boundary where excavation behind the wall may be necessary. However, there is no need for a continued right on the license area extending after construction is complete. Licenses are not registrable and are purely a matter of contract and are revocable. If the form of tenure to the land is an SRW or License as opposed to R/W, then it should be noted on the plan accordingly. Moreover, LTC's must be defined sufficiently (e.g. dimensions) to allow legal survey of the license area in case of expropriation.

Due to their nature, licenses should not be used to gain early entry to private lands that will become R/W due to the risk of revocation or trespass.

Example of a License to Construct

A roadway is in the final stages of construction. A driveway has been provided to a property, and the Ministry did not have to enter the property to join to the existing driveway. The new access is assumed to have an 8% grade.

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If the Ministry was to reduce the grade of the driveway, it would require entering and constructing on the property, but the Ministry does not want to pay any settlements for access to property etc.

It would be beneficial to the property owner to give an LTC to the Ministry, waiving all rights and claims, to allow the Ministry to build a driveway having a lesser grade, and perhaps, more to the owner's preference.

Please note: Everything that is required for the road and its supporting structures should be purchased and not left on SRW's or LTC's.

Acquisition of Property (Partial or Total Acquisition in Fee Simple)

When the property requirement is of a permanent nature, and the land must be purchased, there are two avenues of direction.

1. The property owner is willing to sell the land and agrees to compensation payable. This is a clear-cut transfer of land in fee simple and can be accommodated with a reference plan.
2. Expropriation Act, RSBC 1996, C.125.

In order to protect the rights of the property owner and to establish a procedure to acquire land for highway purposes, the Expropriation Act was legislated in 1987.

Where a property owner signs an agreement to sell the land but disagrees with the compensation payable, Section 3 of the Act ensures that the compensation payable will be settled by the Supreme Court of BC.

Where an owner disagrees with the ministry regarding the sale of the property and the compensation payable, Section 6 of the Act can be used to obtain the land required. Section 6 of the Act defines the entitlements and the procedures to determine compensation and obtain the land.

Right-of-Way (R/W) Development

The proposed R/W boundary shall be shown with a heavy line symbol as per the standard shown in [Section 1260.05](#). Referencing shall be with one of the following methods, listed in the preferred order:

1. An annotated distance along a property line from an existing survey reference point, i.e., an iron pin, as it allows for minor revisions of the L-line without affecting the boundary. Offsets and/or distances shall be to the nearest 0.1 m.
2. Station and offset from the control line. The station where the offset occurs and the distance to the R/W must be clearly labelled. Refer to sample drawing [Figure 1220.M](#).

The expected accuracy for area calculations is high and steps must be taken to provide a conclusive result. Inaccuracies may result in a second or third acquisition from an owner, or overpayment, with risks to project budget, schedule, and the possibility of expropriation.

Where possible, R/W should be established using the same method as will be used by B.C.L.S. to establish final R/W.

Area calculations shall be done to the highest possible precision by one of the following methods which are listed in the preferred order:

1. AutoCAD using applicable geometry
2. On an original mylar/vellum, using applicable geometry
3. Electronic methods such as digitizing tables
4. Planimeter using the average of four readings

Drawing Content

Clearing and grubbing areas shall not be shown on Property Acquisition Plans.

Each parcel of land, enclosed within the R/W and including existing R/W, will have the area shown to the precision shown in "General Survey Instructions to British Columbia Land Surveyors", published by the Surveyor General and reprinted below.

Up to 0.1 ha	quote to 0.0001 ha
From 0.1 ha up to 1 ha	quote to 0.001 ha
From 1 ha up to 10 ha	quote to 0.01 ha
From 10 ha up to 100 ha	quote to 0.1 ha
From 100 ha and over	quote to 1 ha

Individual areas shall be outlined by a box in order to make them easily distinguishable from other plan information.

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Remaining portions of a parcel that have been severed by the proposed highway R/W shall also have areas calculated and labelled as previously defined.

Other than in subdivisions, a table of the areas involved with applicable comments may be located on the drawing containing the largest “take” for that lot. The comments should cross reference the adjacent drawing noting the smaller “take” for that lot.

If one table is all that is required, it is preferable to locate it on the first drawing of the set of acquisition drawings.

If there are many individual areas or several tables, one alternative is to list all tables on one drawing sheet, preferably located at the rear of all acquisition drawings.

Another alternative is to provide an index of tables with applicable drawing numbers to be located on the first Property Acquisition Plan.

Another alternative for larger projects is to provide a table of areas (for each property impacted) per drawing sheet. The table should be located in unobtrusive areas of the plan, and split if necessary, so as to not hide information.

When there is more than one area “take” from a parcel, the drawing numbers will be listed beside the areas. Areas shall be subtotaled per parcel. Refer to the sample table below

Legal Description	New R/W Required	R/W Inside	R/W Outside	License to Construct	Comments
Lot 1, Plan 6976, D.L. 47965	0.0737 ha Dwg-09RW				
Plan 1799-RW			0.0499 ha Dwg-09RW		Encroachment (Northern Railway)
Plan H-275		0.154 ha Dwg-09RW 1.54 ha Dwg-09RW 0.287 ha Dwg-09RW 2.17 ha Dwg-09RW Total 4.15 ha	3.00 ha Dwg-09RW 1.47 ha Dwg-09RW 0.399 ha Dwg-09RW 0.541 ha Dwg-09RW 0.0202 ha Dwg-09RW Total 5.43 ha		Outside Area is Surplus

For urban street design projects, all R/W areas to be shown to the nearest 0.1 m². Areas to be calculated using appropriate geometry. Do NOT use planimeter.

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Right-of-Way Plans – Delivery Package

A delivery package of right-of-way plans shall include the following:

- One set (full size and half size) of all project contract drawings including plans, laning, cross-sections and profiles, unsigned is acceptable
- One copy of area summaries from the Design Folders, form H749
- The Property Acquisition Plan AutoCAD file on CD or DVD disc for the B.C.L.S

Property Acquisition Plans – Check List

- North arrow
- Title block
- Scale and scale bar (metric)
- Table of areas involved and comments
- R/W and dimensions for each parcel
- A sufficient amount of the legal description should be shown on the plan to correctly identify the property. Some legal descriptions are too long to enter in full. In the alternative, use the Land Title Office property identifier (PID) numbers to legally define the property.
- Project number
- All utility poles, buildings, fences, existing land improvements (including underground improvements such as storage tanks) and accesses within 10 m of the proposed R/W and all improvements beyond the 10 m that are impacted by the R/W, accesses and construction but never less than 30 m from centre line
- Existing accesses should be marked to indicate whether the access remains open, to be closed or relocated
- Proposed toes with cut/fill points annotated at transition points
- Obtain all pertinent signatures
- Section 42, and Section 64 gazetted road (all old road) plotted inside/outside the new R/W
- Easement/utility R/W
- Co-ordinate listing (if available)

- All “I.P.’s” and monuments that are found are symbolized. All I.P.’s and monuments that cannot be found, are not to be indicated on the plans
- A “For Property Acquisition Only” stamp, if applicable. (Required on small contract not using separate Property Acquisition Plans)
- Note any and all surveys or plan numbers on the drawing; it is all useful information
- If the area appears to be convoluted, outline the area to be acquired in red pencil on a separate print. If your computer system is appropriate, this may be done automatically.
- Clear and grub line and areas are **not** to be shown

Old Road Areas

There has been some confusion regarding the method of handling old road areas on our plans where the old road does not have a surveyed R/W, or its boundary has not been established by adjacent subdivision.

Section 42 roads are such a case. The following procedure shall apply:

1. All old roads are to be checked with the Regional Office for possible “Gazette Notice”. If there is a Gazette notice, the gazetted width shall be indicated on the plans with a line type similar to that used for “Clearing and Grubbing” and labelled as “R/W established by B.C. Gazette dated _____”.
2. If a Gazette Notice is not in existence, the area of existing road shall be that of the “travelled way”. The travelled way is defined as the width between the outer edges of the road shoulders. It is necessary, therefore, to show on the plans the plotted position of the edge of shoulders obtained by occasional measurement. The area shall be calculated by estimating the average width within each lot.

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1220.12 VOLUME OVERHAUL DIAGRAM

Sample Figures [1220.O](#), [1220.P](#), [1220.Q](#)

A volume overhaul diagram provides a convenient method for studying haul and overhaul and for estimating payments. It is a continuous curve showing the accumulated algebraic sum of volumes [cuts (+) and fills (-)] from the beginning station through the entire project for each individual alignment.

The X-axis (abscissa) is the stationing. The Y-axis (ordinate) represents the tabulated cumulative volume of cut and fill between successive cross sections.

For small projects, cross section areas are calculated, cut and fill volumes are tabulated to give algebraic sum of volumes at each station and the cumulative total. This cumulative total is the ordinate for the volume overhaul diagram.

Cut volumes are adjusted for swell or shrinkage before solving ordinates. Typical adjustment values are shown in the table below.

Material*	Factor	Comment
Type A	20% Swell	Solid rock and rock stratum
Type D	15% Shrinkage 20% Shrinkage	Granular materials Fine-grained silts or clays

*See Standard Specifications 201.11 for exact definitions of Material Types.

Payment for excavation is made at a bid price per cubic metre. This unit price includes payment for excavating and loading material, transporting it any distance less than the freehaul limit and placing it in the fill. The ministry freehaul limit is typically 300 m. The freehaul volumes are determined by offsetting the ordinate line horizontally and re-plotting the ordinates until an intersecting line is reached.

Above the balance line, the freehaul is measured from the bottom of the cut slopes and/or at balance points to the right. Below the balance line, the freehaul is measured from the top of the cut slopes and/or balance points to the left. The resultant

freehaul is the shaded area on the Volume Overhaul Diagram. If material is brought in from a pit, the deadhaul distance from the pit to the road is subtracted from 300 m to solve the remaining freehaul.

It is often necessary to move excavated material beyond the stipulated freehaul distance. This operation is called overhaul. The unit in which overhaul is computed is the "station m". One "station m" is one cubic metre of excavated material moved one 100 m station.

Overhaul areas are the unshaded portions of the volume overhaul diagram. Overhaul volumes are determined as individual areas multiplied by the percentage of each material type times their appropriate swell or inverse shrinkage factor.

Diagram Characteristics

1. A rising line indicates that the excavation quantity is larger than the embankment quantity at that point on the roadway; a falling line indicates the reverse.
2. Steep slopes indicate large differences between cuts and fills at the section; flat slopes indicate small differences.
3. Points of zero slope (top and bottom of curve) indicate changing from an excess of cut to an excess of fill or vice versa.

See [Figure 1220.O](#) for sample overhaul calculations

When Haul is Included in the Bid Price

When haul is included in the bid price, the volume overhaul drawings are "for information only" and a note to this effect must be placed on each drawing.

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1220.13 GRAVEL QUANTITY AND HAUL CHARTS

Sample [Figure 1220.R](#)

The following materials are to have their own quantity and haul charts:

1. High fines 25 mm surfacing aggregate
2. Crushed base course aggregates:
Nominal sizes can be 25, 50 or 75 mm
Specify as: Well, Intermediate or Open-Graded
3. Select Granular Sub-Base
4. Gravel facing
5. Gravel blankets
6. Gravel filter layers
7. Bridge end fills
8. Structural backfill for bin walls and structural steel plate culverts

Haul charts are not required for materials that are to be supplied in place, as bid price includes haul. However, haul charts for such items would assist in bid preparation.

Description of Sample Gravel Quantities and Haul Chart (Figure 1220.R)

Items numbered on chart as follows:

Quantity Charts

1. Project kilometre columns labelled every kilometre. Distances are to scale.
2. Material type headings
3. Quantity required in the kilometre interval. Enter NIL for columns where quantity is "0". All quantities are in unit tonnes.
4. Calculated quantity for fraction of km at end of project
5. Total project quantities for each material type
6. Sum of total project quantities

Haul Charts (distances are to scale)

1. Heading of haul chart, consists of material type and origin of material
2. Haul km, distance from supply location (pit, stockpile, etc.)

3. Identification of material source, its distance from the project, and an arrow indicating where the hauled material enters the project
4. Total hauled material for first km minus freehaul distance* for each direction of haul. Haul quantities are in unit tonnes.
5. Haul for each subsequent km
6. Total km haul
7. Sum of total km haul

Haul Summary

1. Total haul of all materials for each km.
2. Sum of total km haul of all materials.

Haul / Freehaul Notes

For Asphalt Concrete: Pavement / Levelling Course

Payment will be at the unit price bid per tonne, supplied in place. As such, these items are not usually included in the haul chart. Their inclusion is useful in bid preparation.

For Material Stockpiled Prior to Placement

Haul will be measured from the original point of production via the stockpile to the delivery point minus 1 kilometre freehaul.

For Material Placed Directly on Highway

Haul will be measured from the point of production to the delivery point minus 1 kilometre freehaul.

For Material Produced for Stockpiling Only

Haul will be measured from the point of production to the stockpile location minus 1 kilometre freehaul.

1220.14 ENVIRONMENTAL PERMITTING

Sample [Figure 1220.S](#)

Prepare/incorporate a set of drawings for environmental regulatory approval submissions in accordance with Figure 1220.S.

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1230 AUTOCAD LAYERS

1230.01 REVISED STANDARDS

The ministry Highway Engineering AutoCAD layer standards were revised in 2010.

The previous standard listed approximately 50 layers grouped by type of drawing with a variable single letter prefix to identify the office.

Examples: FDET-ROADS (survey office, existing road detail), XDES-LANE (consultant office, design or proposed laning).

1230.02 NCS LAYER STANDARD

General Information

The United States National CAD Standard (NCS) version 4.0 (current as of January 2008) defines a layer naming convention and specific layer codes for multiple disciplines. The standard includes specifications for symbols, linetypes, plot styles, drawing set organization, drafting conventions and other CAD related functions.

Ministry Adoption

The ministry has adopted only the layer naming convention specified by NCS 4.0 with restrictions and the following two additions:

- Use of three additional major codes PROF, STRC and UTIL
- Use of an alignment name in place of a minor code (e.g. L100A1, E100)

No other modifications to the standard are permitted at this time.

NCS Layer Name Format

The format of an NCS layer name is as follows:

DD-MAJR-MINR-MINR-S

The NCS Discipline Designator is 1 or 2 characters, Major/Minor codes are 4 characters and the Status indicator is 1 character. The maximum length of an NCS layer is therefore 19 characters. The minimum length is 6 characters (D-MAJR).

Approved Discipline Designators

The ministry has defined the following approved discipline designators.

DD – Approved Discipline Designators	
B	Geotechnical
C	Civil (design detail)
G	General (titleblocks, viewports, etc.)
S	Structural (bridge drawings only)
V	Survey / Mapping (survey detail)

Approved Major Group Codes

The ministry has defined the following major group codes. Three are non-standard (PROF, STRC, UTIL).

MAJR – Approved Major Group Codes	
ALGN	Alignment
ANNO	Annotation
BORE	Borings
COMM	Communications
CTRL	Control points
DRAN	Drains
IRRG	Irrigation
NGAS	Natural gas
OIL~	Oil
POWR	Power
PROF	Profiles
PROP	Property boundary
RAIL	Railway
ROAD	Roadways
RWAY	Right-of-way
SECT	Section
SIGN	Sign
SITE	Site features
SSWR	Sanitary Sewer
STRC	Structures
STRM	Storm Sewer
SURV	Survey (general survey)
TOPO	Topographic feature
UTIL	Miscellaneous utilities
WATR	Water supply

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Major and Minor Code Usage Rules

As per the NCS 4.0 standard, any major code may be used as a minor code.

Each NCS code comes with a general description. When a layer name is created, its description and the contents of the layer should not alter the meanings of those general descriptions.

For example, the minor code PENS (Penstock) may be used to diagram a pipe that delivers water to a sewage system or water to a turbine in a hydro dam. However, PENS may not be re-purposed to outline an enclosure for confining livestock.

Custom four letter minor group codes may be created as necessary. The tilde character (~) is used as filler to fulfill the four character requirement.

Ministry Restrictions – Additional Layers

1. The ministry provides a standard set of layers. The content placed on those layers should be based on the descriptions provided.
2. Where one or both minor group codes are not specified, additional layers may be created by appending allowable minor group codes.
3. Appending a general purpose annotation minor group code such as ANNO or TEXT is permitted without ministry consultation.
4. The V-SURV-SPOT-<FC~~> layers use feature codes as the second minor code (e.g. V-SURV-SPOT-AN~~ for Spot Elevations - Anchor). These layers may be useful for a finer grained control over spot elevation visibility.
5. For layers C-ALIGN, C-ROAD-TOES and V-ALIGN, an alignment name may be used as a minor group code (see [Section 1230.03 – Layer Name](#)).
6. Descriptions shall be added to the AutoCAD layer table.

All other additions (including status codes) should be submitted prior to use. Cooperation will ensure that layers are being used as intended and that conflicting layers are not being created.

As the standard evolves, the approved layer list may be modified. Suggestions for layer changes should be submitted to the ministry Engineering Branch, Geometric Standards Section.

1230.03 LAYER TABLE PROPERTIES

AutoCAD's layer table contains a number of properties (columns) that will be used to control the appearance of all drawing objects.

All drawing objects are to have their applicable properties set to ByLayer to take advantage of the layer control features.

Standards compliance for a specific drawing can then be assured by verifying the correctness of the layer table and by confirming that all objects are using the ByLayer attributes.

Layer Name

The layer name will follow the format DD-MAJR or DD-MAJR-MINR or DD-MAJR-MINR-MINR where:

- DD is a single letter discipline designator taken from the approved list
- MAJR is the major group code taken from the approved list
- MINR is a minor group code:
 - Length is four letters, uses tilde (~) characters for filler as necessary
 - Taken from the NCS minor group list if the NCS description fits
 - Custom codes are allowed
- For the C-ALIGN, C-ALIGN-CURV, C-ALIGN-MAJR, ... layers and V-ALIGN equivalents, the alignment name may be inserted in the layer name as the first minor group code (e.g. C-ALIGN-L100A1 or V-ALIGN-E100-TEXT)
- For the V-SURV-SPOT layer, additional layers may be created for individual features codes (e.g. V-SURV-SPOT-AN~~ for General Survey - Spot Elevations - Anchor.
- All letters are uppercase

Note that the MAJR and MINR placeholders used above represent all possible major and minor NCS group codes. However, "MAJR" and "MINR" are themselves commonly used minor group codes.

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Layer Description

The layer descriptions are provided by the ministry, additional layers are to be described using the same format.

Layer On/Freeze

Entities on layers that are off or frozen are not visible and will not plot in model space, paper space or in any layout viewport.

If the drawing is x-referenced into another drawing the on/freeze statuses of the xref layers may be adjusted without affecting the original drawing.

Other Effects of Off Layers

Layers that are off (not frozen) are still part of the drawing and are analyzed during typical operations. For example, the quick select command should be used with caution since it can be used to select, move, copy or delete objects on an “off” layer.

Other Effects of Frozen Layers

Objects on layers that are frozen are not selectable or changeable and are ignored for drawing extents, hatching or regen type calculations. Freezing layers may improve AutoCAD’s performance.

Blocks or XREFs on Layers that are Frozen

Blocks or x-references inserted on layers that are frozen are not visible even if the internal entities are on visible layers.

Blocks or XREFs on Layers that are Off

Blocks inserted on layers that are off may be visible if their internal entities reside on visible layers.

The visibility of xref drawing entities is not affected by the layer containing the xref being off because the internal entities are always on another layer.

Layer Lock

Entities on locked layers cannot be modified.

Layer Colour

The colour attribute for all entities should be set to ByLayer. The only exception is internal block entities for multi-colour blocks such as the titleblock.

Layer colours are chosen to differentiate existing data from design data.

Layer Color	Usage
1-9, 250-255	Common
12, 16	Bridge
30, 36, 165, 202, 241	Design
10, 11, 22, 32	Survey
50, 53, 74, 83, 90	
116, 133, 135, 150, 155, 170	
200, 210, 231	

Layer Linetype

The Linetype attribute for all entities should be set to ByLayer. Most layers are assigned a Continuous linetype.

Layers such as C-SSWR-PIPE have a custom linetype assigned. Polylines assigned to these layers will automatically display the correct pattern.

Related text labels and other AutoCAD entities not affected by linetype may also be added to these layers.

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Layer Lineweight

The Lineweight attribute for all entities should be set to ByLayer.

Layer linewidth is primarily used for on-screen viewing. There is an on/off toggle on the status bar for this purpose.

Current LCD display technology (85-140 dpi) is too low to make this feature useful at present so the toggle is generally left off.

Where weight is concerned, the largest group of layers is the 0.25 mm layers and those are assigned a linewidth of “Default”.

“Default” is defined as “0.25 mm” in the linewidth settings dialog. Using “Default” instead of “0.25 mm” in the layer table improves AutoCAD’s performance significantly.

Using Layer Lineweight for Plotting

Some jurisdictions use the layer linewidth to determine plot linewidth. However, ministry STB plot styles use numerical weights because of the requirement for thinner lines on half-size plots.

Layer Transparency

The Transparency attribute for all entities should be set to ByLayer. All standard ministry layers have the transparency set to 0.

Transparency varies between 0 (full color) and 100 (fully transparent or invisible) and may be useful for raster images or fading the intensity of survey data.

As this feature is not available in all versions of AutoCAD, and the side effects are not known, the recommended method for screening existing detail in design plots is to alter the plot style for those layers (see [Section 1240.13](#)).

Layer Plot Style

The Plot Style attribute for all entities should be set to ByLayer. One plot style name (from a predefined list) is assigned to each layer. This will determine the plotting attributes for all entities on the layer.

The plot dialog allows an STB file to be assigned to each layout. The STB file contains the definitions for the plot style names.

Each ministry STB file contains an identical list of plot style names with different definitions. Selecting a particular STB file determines whether the plot is color or black/grey and whether the pen widths are full size or half size.

[Section 1240](#) contains additional details regarding the ministry plot style standards.

Layer Plot On/Off

Certain layers are defined as global non-plotting layers (e.g. G-ANNO-VPRT for layout viewports). This setting allows layer entities to be seen on-screen but not on the plot.

Layer Settings Per Viewport

Additional viewport specific columns have been added to the layer table in recent versions of AutoCAD.

This list now includes: VP Freeze, VP Color, VP Linetype, VP Lineweight, VP Transparency and VP Plot Style.

These settings allow individual layers to be frozen or the color, linetype, linewidth, transparency or plot style to be adjusted on a per viewport basis when plotting from a layout.

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1230.04 LAYER LIST

NCS LAYER	COLOR	LINETYPE	WEIGHT	PLOT STYLE	DESCRIPTION (see notes at the bottom of the table)
B-ANNO-LEGN	1	Continuous	0.25 mm	Color-Black 25	Geotech - Annotation - Legends
B-ANNO-NOTE	1	Continuous	0.25 mm	Color-Black 25	Geotech - Annotation - Notes
B-ANNO-TEXT	251	Continuous	0.13 mm	Grey 40% 13	Geotech - Annotation - Text
B-BORE-ESWT	5	GEO-WTE	0.25 mm	Color-Grey 60% 25	Geotech - Estimated Water Table Elevation
B-BORE-MSWT	5	GEO-WTM	0.25 mm	Color-Grey 60% 25	Geotech - Measured Water Table Elevation
B-BORE-SPLN	1	Continuous	0.25 mm	Color-Black 25	Geotech - Seismic Profile Line
B-BORE-SYMB	241	Continuous	0.25 mm	Black 25	Geotech - Symbols
B-BORE-SYMB-FEAT	1	Continuous	0.25 mm	Color-Black 25	Geotech - Symbols - Feature with Attribute
B-BORE-SYMB-HOLE	1	Continuous	0.25 mm	Color-Black 25	Geotech - Symbols - Auger Hole or Borehole
B-BORE-SYMB-HUBA	1	Continuous	0.25 mm	Color-Black 25	Geotech - Symbols - Hub with Attribute
B-BORE-SYMB-TEST	2	Continuous	0.35 mm	Black 35	Geotech - Symbols - Test Instruments
B-BORE-SYMB-THOL	1	Continuous	0.25 mm	Color-Black 25	Geotech - Symbols - Testhole
B-BORE-SYMB-TPIT	1	Continuous	0.25 mm	Color-Black 25	Geotech - Symbols - Testpit
C-ALGN	4	Continuous	0.70 mm	Color-Black 70	Alignment - Base Layer
C-ALGN-ANNO	1	Continuous	0.25 mm	Color-Black 25	Alignment - Minor Labels (Coordinates, Bearings)
C-ALGN-CURV	2	Continuous	0.35 mm	Black 35	Alignment - Curve and Spiral Data
C-ALGN-L100A1	4	Continuous	0.70 mm	Color-Black 70	Alignment - Specific Alignment
C-ALGN-L100A1-ANNO	1	Continuous	0.25 mm	Color-Black 25	Alignment - Minor Labels (Coordinates, Bearings)
C-ALGN-L100A1-CURV	2	Continuous	0.35 mm	Black 35	Alignment - Curve and Spiral Data
C-ALGN-L100A1-MAJR	2	Continuous	0.35 mm	Black 35	Alignment - 100m Major Tics and Text
C-ALGN-L100A1-MINR	1	Continuous	0.25 mm	Color-Black 25	Alignment - 20m Minor Tics
C-ALGN-L100A1-TEXT	2	Continuous	0.35 mm	Black 35	Alignment - Major Labels (POTs, Pls, Curve Points)
C-ALGN-LOCN	3	Continuous	0.50 mm	Color-Black 50	Alignment - Limit of Construction
C-ALGN-MAJR	2	Continuous	0.35 mm	Black 35	Alignment - 100m Major Tics and Text
C-ALGN-MINR	1	Continuous	0.25 mm	Color-Black 25	Alignment - 20m Minor Tics
C-ALGN-NOTE	2	Continuous	0.35 mm	Black 35	Alignment - Notations
C-ALGN-TEXT	2	Continuous	0.35 mm	Black 35	Alignment - Major Labels (POTs, Pls, Curve Points)
C-COMM	1	Continuous	0.25 mm	Color-Black 25	Telephone and Cable - Base Layer
C-COMM-CNDT	3	UG-TEL	0.50 mm	Color-Black 50	Telephone and Cable - Underground Conduit
C-COMM-SYMB	1	Continuous	0.25 mm	Color-Black 25	Telephone and Cable - Symbols
C-COMM-TEXT	1	Continuous	0.25 mm	Color-Black 25	Telephone and Cable - Text
C-DRAN	3	Continuous	0.50 mm	Color-Black 50	Drainage - Base Layer
C-DRAN-CBAS	1	Continuous	0.25 mm	Color-Black 25	Drainage - Catch Basin
C-DRAN-CULV	4	Continuous	0.70 mm	Color-Black 70	Drainage - Culvert
C-DRAN-CULV-TEXT	2	Continuous	0.35 mm	Black 35	Drainage - Culvert Text
C-DRAN-DTCH	3	Continuous	0.50 mm	Color-Black 50	Drainage - Ditch
C-DRAN-DTCH-CNTR	3	HYD-CNTR	0.50 mm	Color-Black 50	Drainage - Ditch Centre
C-DRAN-RRAP	1	CONST-RRAP	0.25 mm	Color-Black 25	Drainage - Riprap
C-DRAN-SWAY	1	Continuous	0.25 mm	Color-Black 25	Drainage - Spillway
C-DRAN-TEXT	2	Continuous	0.35 mm	Black 35	Drainage - Notes
C-NGAS	3	Continuous	0.50 mm	Color-Black 50	Natural Gas - Base Layer
C-NGAS-PIPE	3	UG-GAS	0.50 mm	Color-Black 50	Natural Gas - Pipeline
C-NGAS-SYMB	1	Continuous	0.25 mm	Color-Black 25	Natural Gas - Symbols
C-NGAS-TEXT	3	Continuous	0.50 mm	Color-Black 50	Natural Gas - Text
C-OIL~	3	Continuous	0.50 mm	Color-Black 50	Oil - Base Layer
C-OIL~-SYMB	1	Continuous	0.25 mm	Color-Black 25	Oil - Symbols
C-OIL~-TEXT	3	Continuous	0.50 mm	Color-Black 50	Oil - Text
C-OIL~-UGND	3	UG-OIL	0.50 mm	Color-Black 50	Oil - Underground
C-POWR	1	Continuous	0.25 mm	Color-Black 25	Electrical Power - Base Layer
C-POWR-CNDT	3	UG-ELEC	0.50 mm	Color-Black 50	Electrical Power - Underground Conduit
C-POWR-SYMB	1	Continuous	0.25 mm	Color-Black 25	Electrical Power - Symbols
C-POWR-TEXT	1	Continuous	0.25 mm	Color-Black 25	Electrical Power - Text
C-PROF	4	Continuous	0.70 mm	Color-Black 70	Profiles - Base Layer
C-PROF-ALGN	4	Continuous	0.70 mm	Color-Black 70	Profiles - Design Profile
C-PROF-ALGN-HILO	2	Continuous	0.35 mm	Black 35	Profiles - Design Profile - High Points and Low Points
C-PROF-ALGN-TEXT	2	Continuous	0.35 mm	Black 35	Profiles - Design Profile - Text

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NCS LAYER	COLOR LINETYPE		WEIGHT	PLOT STYLE	DESCRIPTION (see notes at the bottom of the table)
C-PROF-DRAIN	5	Continuous	0.25 mm	Color-Grey 60% 25	Profiles - Drainage
C-PROF-DRAIN-TEXT	5	Continuous	0.25 mm	Color-Grey 60% 25	Profiles - Drainage Text
C-PROF-EXST-DRAIN	165	Continuous	0.25 mm	Grey 60% 25	Profiles - Existing Detail - Drainage
C-PROF-EXST-GRND	165	Continuous	0.25 mm	Grey 60% 25	Profiles - Existing Detail - Existing Ground
C-PROF-EXST-ROCK	165	Continuous	0.25 mm	Grey 60% 25	Profiles - Existing Detail - Rock Stratum
C-PROF-EXST-TEXT	165	Continuous	0.25 mm	Grey 60% 25	Profiles - Existing Detail - Text
C-PROF-EXST-UTIL	165	Continuous	0.25 mm	Grey 60% 25	Profiles - Existing Detail - Utilities
C-PROF-GRID-LABL	1	Continuous	0.25 mm	Color-Black 25	Profiles - Grid - Grid Labels
C-PROF-GRID-MAJR	1	Continuous	0.25 mm	Color-Black 25	Profiles - Grid - Major Grid Lines
C-PROF-GRID-MINR	251	Continuous	0.13 mm	Grey 40% 13	Profiles - Grid - Minor Grid Lines
C-PROF-HORZ-DATA	2	Continuous	0.35 mm	Black 35	Profiles - Horizontal - Superelevation
C-PROF-HORZ-LINE	3	Continuous	0.50 mm	Color-Black 50	Profiles - Horizontal - Lines
C-PROF-HORZ-LOCN	3	Continuous	0.50 mm	Color-Black 50	Profiles - Horizontal - Limit of Construction
C-PROF-HORZ-TEXT	2	Continuous	0.35 mm	Black 35	Profiles - Horizontal - Text
C-PROF-HORZ-XING	1	Continuous	0.25 mm	Color-Black 25	Profiles - Horizontal - Crossing Chains
C-PROF-QUAN	2	Continuous	0.35 mm	Black 35	Profiles - Quantities
C-PROF-STRM	1	Continuous	0.25 mm	Color-Black 25	Profiles - Closed Drainage
C-PROF-STRM-TEXT	1	Continuous	0.25 mm	Color-Black 25	Profiles - Closed Drainage - Text
C-ROAD	1	Continuous	0.25 mm	Color-Black 25	Roads - Base Layer
C-ROAD-AREA-TEMP	7	Continuous	0.35 mm	Black 35	Roads - Area Takeoffs for Calculations
C-ROAD-ARRW	1	Continuous	0.25 mm	Color-Black 25	Roads - Direction Arrow (plan annotation)
C-ROAD-BARM-CABL	6	BAR-CABLE	0.25 mm	Color-Black 25	Roads - Median Barrier - Cable
C-ROAD-BARM-CONC	6	BAR-MB	0.25 mm	Color-Black 25	Roads - Median Barrier - Concrete
C-ROAD-BARM-GRAL	6	Continuous	0.25 mm	Color-Black 25	Roads - Median Barrier - Steel Guard Rail
C-ROAD-BARR-CABL	6	BAR-CABLE	0.25 mm	Color-Black 25	Roads - Roadside Barrier - Cable
C-ROAD-BARR-CONC	6	BAR-RB	0.25 mm	Color-Black 25	Roads - Roadside Barrier - Concrete
C-ROAD-BARR-GRAL	3	BAR-GUARD	0.50 mm	Color-Black 50	Roads - Roadside Barrier - Guard Rail (Steel)
C-ROAD-BARR-PNEB	6	Continuous	0.25 mm	Color-Black 25	Roads - Roadside Barrier - Not Controlled by Pavement
C-ROAD-CNTR	6	ALGN-CNTR	0.25 mm	Color-Black 25	Roads - Centreline (if alignment is offset from centre)
C-ROAD-CURB	6	Continuous	0.25 mm	Color-Black 25	Roads - Curb
C-ROAD-CURB-ASPH	3	Continuous	0.50 mm	Color-Black 50	Roads - Curb - Asphalt
C-ROAD-CURB-CONC	6	Continuous	0.25 mm	Color-Black 25	Roads - Curb - Concrete
C-ROAD-CURB-TEXT	6	Continuous	0.25 mm	Color-Black 25	Roads - Curb - Description (label curb start, end and
C-ROAD-DRIV	1	Continuous	0.25 mm	Color-Black 25	Roads - Driveway
C-ROAD-GRVL-SHLD	1	Continuous	0.25 mm	Color-Black 25	Roads - Gravel Shoulder
C-ROAD-GUTR	6	Continuous	0.25 mm	Color-Black 25	Roads - Gutter
C-ROAD-LANE	2	Continuous	0.35 mm	Black 35	Roads - Lane Edge
C-ROAD-LANE-TEXT	1	Continuous	0.25 mm	Color-Black 25	Roads - Lane Text
C-ROAD-MRKG-ARRW	1	Continuous	0.25 mm	Color-Black 25	Roads - Pavement Marking - Direction Arrow
C-ROAD-MRKG-BRKN	2	ALGN-BWL	0.35 mm	Black 35	Roads - P... - Broken White Line - Rural Paintline
C-ROAD-MRKG-BUSB	2	ALGN-BWL-PUL	0.35 mm	Black 35	Roads - P... - Broken White Line - Bus Bay Pullout
C-ROAD-MRKG-CHEV	6	Continuous	0.25 mm	Color-Black 25	Roads - P... - Chevrons
C-ROAD-MRKG-DECL	2	ALGN-DECL	0.35 mm	Black 35	Roads - P... - Deceleration or Acceleration Lane
C-ROAD-MRKG-IGLN	2	ALGN-IGL	0.35 mm	Black 35	Roads - P... - Intersection/Bicycle Guiding Line
C-ROAD-MRKG-LNEG	5	Continuous	0.25 mm	Color-Grey 60% 25	Roads - P... - Lane Edge
C-ROAD-MRKG-MEDN	5	Continuous	0.25 mm	Color-Grey 60% 25	Roads - P... - Median
C-ROAD-MRKG-RCLN	2	ALGN-BWL-CIRC	0.35 mm	Black 35	Roads - P... - Broken ... - Roundabout Circulating Lane
C-ROAD-MRKG-RSLN	2	ALGN-BWL-RES	0.35 mm	Black 35	Roads - P... - Broken ... - Reserved Lane
C-ROAD-MRKG-RYLN	2	ALGN-BWL-YIELD	0.35 mm	Black 35	Roads - P... - Broken ... - Roundabout Yield Line
C-ROAD-MRKG-UPLN	2	ALGN-BWL-URB	0.35 mm	Black 35	Roads - P... - Broken ... - Urban Paintline
C-ROAD-MRKG-WHIT	2	Continuous	0.35 mm	Black 35	Roads - P... - White Line
C-ROAD-MRKG-YELO	2	Continuous	0.35 mm	Black 35	Roads - P... - Yellow Line
C-ROAD-PATT-BNDY	7	Continuous	0.35 mm	Black 35	Roads - Shade Boundary
C-ROAD-PATT-SHD1	251	Continuous	0.13 mm	Grey 40% 13	Roads - Shade Pattern 1
C-ROAD-PATT-SHD2	253	Continuous	0.25 mm	Grey 60% 25	Roads - Shade Pattern 2
C-ROAD-PVMT-EDGE	3	Continuous	0.50 mm	Color-Black 50	Roads - Edge of Pavement
C-ROAD-RAIS	3	Continuous	0.50 mm	Color-Black 50	Roads - Raised Island or Median

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NCS LAYER	COLOR	LINETYPE	WEIGHT	PLOT STYLE	DESCRIPTION (see notes at the bottom of the table)
C-ROAD-RAIS-DETL	1	Continuous	0.25 mm	Color-Black 25	Roads - Raised Island or Median - Details (Letdowns /
C-ROAD-RAIS-PATT	1	Continuous	0.25 mm	Color-Black 25	Roads - Raised Island or Median - Shading
C-ROAD-SHLD	1	ALGN-SHLD	0.25 mm	Color-Black 25	Roads - Shoulder of Fill
C-ROAD-SWLK	2	Continuous	0.35 mm	Black 35	Roads - Sidewalk
C-ROAD-TEXT	1	Continuous	0.25 mm	Color-Black 25	Roads - Geometry Text
C-ROAD-TOES	6	TOES-TOE	0.25 mm	Color-Black 25	Roads - Toes
C-ROAD-TOES-BBEF	6	TOES-BBEF	0.25 mm	Color-Black 25	Roads - Toes - Base of Bridge End Fill
C-ROAD-TOES-BERM	1	CONST-BERM	0.25 mm	Color-Black 25	Roads - Toes - Berm in Cut or Fill
C-ROAD-TOES-L100A1	1	Continuous	0.25 mm	Color-Black 25	Roads - Toes for Specific Alignment
C-ROAD-TOES-SHEX	6	TOES-SHEX	0.25 mm	Color-Black 25	Roads - Toes - Shoulder Excavation
C-ROAD-TOES-SURF	1	TOES-TOE	0.25 mm	Color-Black 25	Roads - Toes - Cross Section Surface Limit
C-ROAD-TOES-VCUT	6	Continuous	0.25 mm	Color-Black 25	Roads - Toes - Vertical Cutoff
C-ROAD-TOES-ZERO	6	Continuous	0.25 mm	Color-Black 25	Roads - Toes - Zero Point Between Cut/Fill
C-ROAD-TURN	6	Continuous	0.25 mm	Color-Black 25	Roads - Turn Calculations
C-ROAD-TURN-CARS	7	Continuous	0.35 mm	Black 35	Roads - Turn Calculations - Vehicle Outline
C-ROAD-TURN-FFEN	2	ALGN-PATH	0.35 mm	Black 35	Roads - Turn Calculations - Front Fender Path
C-ROAD-TURN-FLOG	3	Continuous	0.50 mm	Color-Black 50	Roads - Turn Calculations - Front Log End Path
C-ROAD-TURN-RLOG	4	Continuous	0.70 mm	Color-Black 70	Roads - Turn Calculations - Rear Log End Path
C-ROAD-TURN-ROVH	30	Continuous	0.25 mm	Black 25	Roads - Turn Calculations - Rear Overhang Path
C-ROAD-TURN-RWHL	1	Continuous	0.25 mm	Color-Black 25	Roads - Turn Calculations - Rear Wheel Path
C-RWAY-AREA-PATT	1	Continuous	0.25 mm	Color-Black 25	Right-of-way - Shading
C-RWAY-AREA-TEMP	7	Continuous	0.35 mm	Black 35	Right-of-way - Area Calculations
C-RWAY-BNDY	4	LOT-RW	0.70 mm	Color-Black 70	Right-of-way - Boundary
C-RWAY-CLGR-BNDY	3	CONST-CLGR	0.50 mm	Color-Black 50	Right-of-way - Clearing and Grubbing Boundary
C-RWAY-CLGR-TEMP	2	Continuous	0.35 mm	Black 35	Right-of-way - Clearing and Grubbing Area Calculations
C-RWAY-CLGR-TEXT	2	Continuous	0.35 mm	Black 35	Right-of-way - Clearing and Grubbing Text
C-RWAY-CORD-TEXT	2	Continuous	0.35 mm	Black 35	Right-of-way - Coordinate Text
C-RWAY-TEXT	2	Continuous	0.35 mm	Black 35	Right-of-way - Text
C-RWAY-TLCA	2	LOT-EA	0.35 mm	Black 35	Right-of-way - Temporary License for Construction
C-RWAY-TLCA-PATT	1	Continuous	0.25 mm	Color-Black 25	Right-of-way - Temporary License for Construction
C-RWAY-TLCA-TEMP	1	Continuous	0.25 mm	Color-Black 25	Right-of-way - Temporary License for Construction
C-RWAY-TLCA-TEXT	1	Continuous	0.25 mm	Color-Black 25	Right-of-way - Temporary License for Construction
C-RWAY-WAST	1	Continuous	0.25 mm	Color-Black 25	Right-of-way - Waste
C-SECT	6	Continuous	0.25 mm	Color-Black 25	Cross Sections - Base Layer
C-SECT-BARR-CONC	5	Continuous	0.25 mm	Color-Grey 60% 25	Cross Sections - Concrete Roadside Barrier
C-SECT-CURB	5	Continuous	0.25 mm	Color-Grey 60% 25	Cross Sections - Curb
C-SECT-CURB-DRAN	5	Continuous	0.25 mm	Color-Grey 60% 25	Cross Sections - Drainage Curb
C-SECT-DETL	1	Continuous	0.25 mm	Color-Black 25	Cross Sections - Template Line Features
C-SECT-DETL-ANNO	6	Continuous	0.25 mm	Color-Black 25	Cross Sections - Template Point Features
C-SECT-DIMS-MAJR	2	Continuous	0.35 mm	Black 35	Cross Sections - Major Dimensions (2.5mm)
C-SECT-DIMS-MINR	1	Continuous	0.25 mm	Color-Black 25	Cross Sections - Minor Dimensions (1.8mm)
C-SECT-EXST	36	Continuous	0.35 mm	Grey 60% 35	Cross Sections - Existing Ground
C-SECT-GRID-MAJR	253	Continuous	0.25 mm	Grey 60% 25	Cross Sections - Major Grid
C-SECT-GRID-MINR	251	Continuous	0.13 mm	Grey 40% 13	Cross Sections - Minor Grid
C-SECT-GUTR	5	Continuous	0.25 mm	Color-Grey 60% 25	Cross Sections - Curb and Gutter
C-SECT-MILL	5	Continuous	0.25 mm	Color-Grey 60% 25	Cross Sections - Milling Limits
C-SECT-PATT-MAJR	2	Continuous	0.35 mm	Black 35	Cross Sections - Major Hatching Area
C-SECT-PATT-MINR	1	Continuous	0.25 mm	Color-Black 25	Cross Sections - Minor Hatching Area
C-SECT-SKCH	1	Continuous	0.25 mm	Color-Black 25	Cross Sections - Sketching
C-SECT-STRP	30	CONST-STRIP	0.25 mm	Black 25	Cross Sections - Stripping
C-SECT-SURF	1	Continuous	0.25 mm	Color-Black 25	Cross Sections - Surfaces
C-SECT-SURV	253	Continuous	0.25 mm	Grey 60% 25	Cross Sections - Existing Features (Feature Code Labels)
C-SECT-TEXT	1	Continuous	0.25 mm	Color-Black 25	Cross Sections - New Features (Feature Code Labels)
C-SECT-TEXT-ALGN	3	Continuous	0.50 mm	Color-Black 50	Cross Sections - New Features (Centreline Labels)
C-SECT-TOPO	1	Continuous	0.25 mm	Color-Black 25	Cross Sections - Existing Topographic Features
C-SECT-TOPO-HOGF	1	CONST-HOGF	0.25 mm	Color-Black 25	Cross Sections - Hog Fuel (Construction)
C-SECT-TYPA	241	GEO-TYPE-A	0.25 mm	Black 25	Cross Sections - Type A (Solid Rock) Material Interface

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BC MoTI

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NCS LAYER	COLOR	LINETYPE	WEIGHT	PLOT STYLE	DESCRIPTION (see notes at the bottom of the table)
C-SECT-TYPB	202	GEO-TYPE-B	0.25 mm	Grey 60% 25	Cross Sections - Type B (Over 50% Broken) Material
C-SECT-TYPC	165	GEO-TYPE-C	0.25 mm	Grey 60% 25	Cross Sections - Type C (Requires Ripping) Material
C-SECT-TYPD	5	Continuous	0.25 mm	Color-Grey 60% 25	Cross Sections - Type D Material Interface
C-SECT-VOLM-AFIL	1	Continuous	0.25 mm	Color-Black 25	Cross Sections - Volumes - Type-A Fill
C-SECT-VOLM-BFIL	241	Continuous	0.25 mm	Black 25	Cross Sections - Volumes - Type-B Fill
C-SECT-VOLM-CFIL	1	Continuous	0.25 mm	Color-Black 25	Cross Sections - Volumes - Type-C Fill
C-SECT-VOLM-DFIL	5	Continuous	0.25 mm	Color-Grey 60% 25	Cross Sections - Volumes - Type-D Fill
C-SECT-VOLM-WALL	165	Continuous	0.25 mm	Grey 60% 25	Cross Sections - Walls - Volumes
C-SECT-WALL	2	Continuous	0.35 mm	Black 35	Cross Sections - Walls - Surfaces
C-SECT-WALL-SECD	30	Continuous	0.25 mm	Black 25	Cross Sections - Walls - Secondary - Surfaces
C-SECT-WAST	1	Continuous	0.25 mm	Color-Black 25	Cross Sections - Waste
C-SIGN	1	Continuous	0.25 mm	Color-Black 25	Signs - Base Layer
C-SIGN-IMAG	2	Continuous	0.35 mm	Black 35	Signs - Preview Image (GIF)
C-SIGN-TEXT	1	Continuous	0.25 mm	Color-Black 25	Signs - Text
C-SITE	1	Continuous	0.25 mm	Color-Black 25	General Site Features
C-SITE-CGRD	3	Continuous	0.50 mm	Color-Black 50	General Site Features - Cattle Guard
C-SITE-FENC	3	EXST-FENCE	0.50 mm	Color-Black 50	General Site Features - Fence
C-SITE-VEGE-TREE	3	Continuous	0.50 mm	Color-Black 50	Vegetation - Trees
C-SSWR	3	Continuous	0.50 mm	Color-Black 50	Sanitary Sewer - Base Layer
C-SSWR-FORC	3	Continuous	0.50 mm	Color-Black 50	Sanitary Sewer - Force Main
C-SSWR-FORC-PIPE	3	Continuous	0.50 mm	Color-Black 50	Sanitary Sewer - Force Main - Pipeline
C-SSWR-FORC-SYMB	1	Continuous	0.25 mm	Color-Black 25	Sanitary Sewer - Force Main - Symbols
C-SSWR-FORC-TEXT	3	Continuous	0.50 mm	Color-Black 50	Sanitary Sewer - Force Main - Text
C-SSWR-PIPE	3	UG-SAN	0.50 mm	Color-Black 50	Sanitary Sewer - Pipeline
C-SSWR-SYMB	1	Continuous	0.25 mm	Color-Black 25	Sanitary Sewer - Symbols
C-SSWR-TEXT	3	Continuous	0.50 mm	Color-Black 50	Sanitary Sewer - Text
C-STRC	3	Continuous	0.50 mm	Color-Black 50	Structures - Base Layer
C-STRC-BRDG	3	Continuous	0.50 mm	Color-Black 50	Structures - Bridge
C-STRC-BRDG-TEXT	1	Continuous	0.25 mm	Color-Black 25	Structures - Bridge - Text
C-STRC-MISC	1	Continuous	0.25 mm	Color-Black 25	Structures - Miscellaneous
C-STRC-WALL	3	Continuous	0.50 mm	Color-Black 50	Structures - Wall
C-STRC-WALL-BINW	3	WALL-DESIGN	0.50 mm	Color-Black 50	Structures - Wall - Bin
C-STRC-WALL-HEAD	3	WALL-DESIGN	0.50 mm	Color-Black 50	Structures - Wall - Head
C-STRC-WALL-RETN	3	WALL-DESIGN	0.50 mm	Color-Black 50	Structures - Wall - Retaining
C-STRC-WALL-TEXT	1	Continuous	0.25 mm	Color-Black 25	Structures - Wall - Text
C-STRC-WALL-WING	3	WALL-DESIGN	0.50 mm	Color-Black 50	Structures - Wall - Wing
C-STRM	3	Continuous	0.50 mm	Color-Black 50	Storm Sewer - Base Layer
C-STRM-PIPE	3	UG-DRAIN	0.50 mm	Color-Black 50	Storm Sewer - Pipeline
C-STRM-SYMB	1	Continuous	0.25 mm	Color-Black 25	Storm Sewer - Symbols
C-STRM-TEXT	3	Continuous	0.50 mm	Color-Black 50	Storm Sewer - Text
C-TOPO-BNDY-HOGF	1	CONST-HOGF	0.25 mm	Color-Black 25	Construction Survey - Hog Fuel Boundary
C-TOPO-BRKL	165	Continuous	0.25 mm	Grey 60% 25	Construction Survey - Change to Material
C-TOPO-OVBD	165	Continuous	0.25 mm	Grey 60% 25	Construction Survey - Overburden
C-TOPO-SPOT	6	Continuous	0.25 mm	Color-Black 25	Construction Survey - Spot Elevations
C-TOPO-SPOT-LINE	1	Continuous	0.25 mm	Color-Black 25	Construction Survey - Spot Elevations - Leaders and
C-TOPO-SPOT-TEXT	1	Continuous	0.25 mm	Color-Black 25	Construction Survey - Spot Elevations - Text
C-UTIL	1	Continuous	0.25 mm	Color-Black 25	Miscellaneous Utilities - Base Layer
C-UTIL-SGNL	6	Continuous	0.25 mm	Color-Black 25	Miscellaneous Utilities - Traffic Signals and Controllers
C-UTIL-SYMB	1	Continuous	0.25 mm	Color-Black 25	Miscellaneous Utilities - Symbols
C-UTIL-TEXT	2	Continuous	0.35 mm	Black 35	Miscellaneous Utilities - Text
C-UTIL-UGND	3	UG-MISC	0.50 mm	Color-Black 50	Miscellaneous Utilities - Underground
C-WATR	3	Continuous	0.50 mm	Color-Black 50	Water - Base Layer
C-WATR-PIPE	3	UG-WATER	0.50 mm	Color-Black 50	Water - Pipeline
C-WATR-SYMB	1	Continuous	0.25 mm	Color-Black 25	Water - Symbols
C-WATR-TEXT	3	Continuous	0.50 mm	Color-Black 50	Water - Text
G-ANNO	1	Continuous	0.25 mm	Color-Black 25	Annotation - Base Layer
G-ANNO-DETL	1	Continuous	0.25 mm	Color-Black 25	Annotation - Detail Blowups

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NCS LAYER	COLOR	LINETYPE	WEIGHT	PLOT STYLE	DESCRIPTION (see notes at the bottom of the table)
G-ANNO-DETL-TEXT	1	Continuous	0.25 mm	Color-Black 25	Annotation - Detail Blowups - Text
G-ANNO-MATC	7	Continuous	0.35 mm	Black 35	Annotation - Match Lines
G-ANNO-MATC-TEXT	1	Continuous	0.25 mm	Color-Black 25	Annotation - Match Lines - Text
G-ANNO-NOTE	7	Continuous	0.35 mm	Black 35	Annotation - General Design Notes
G-ANNO-NRTH	7	Continuous	0.35 mm	Black 35	Annotation - North Arrow
G-ANNO-TEMP	7	Continuous	0.35 mm	Black 35	Annotation - Temporary Text
G-ANNO-TEXT	7	Continuous	0.35 mm	Black 35	Annotation - Text
G-ANNO-TTLB	7	Continuous	0.35 mm	Black 35	Annotation - Titleblock - Border and Frame
G-ANNO-TTLB-TEXT	1	Continuous	0.25 mm	Color-Black 25	Annotation - Titleblock - Text, Scales and Logos
G-ANNO-VFRM	1	Continuous	0.25 mm	Color-Black 25	Annotation - Sheet Layout View Frames
G-ANNO-VFRM-TEXT	1	Continuous	0.25 mm	Color-Black 25	Annotation - Sheet Layout View Frames Text
G-ANNO-VPRT	30	Continuous	0.25 mm	Black 25	Annotation - Viewports
V-ALGN	4	Continuous	0.70 mm	Color-Black 70	Alignment - Base Layer
V-ALGN-ANNO	1	Continuous	0.25 mm	Color-Black 25	Alignment - Minor Labels (Coordinates, Bearings)
V-ALGN-CURV	2	Continuous	0.35 mm	Black 35	Alignment - Curve and Spiral Data
V-ALGN-E100	4	Continuous	0.70 mm	Color-Black 70	Alignment - Specific Alignment
V-ALGN-E100-ANNO	1	Continuous	0.25 mm	Color-Black 25	Alignment - Minor Labels (Coordinates, Bearings)
V-ALGN-E100-CURV	2	Continuous	0.35 mm	Black 35	Alignment - Curve and Spiral Data
V-ALGN-E100-MAJR	2	Continuous	0.35 mm	Black 35	Alignment - 100m Major Tics and Text
V-ALGN-E100-MINR	1	Continuous	0.25 mm	Color-Black 25	Alignment - 20m Minor Tics
V-ALGN-E100-TEXT	2	Continuous	0.35 mm	Black 35	Alignment - Major Labels (POTs, Pls, Curve Points)
V-ALGN-LOCN	3	Continuous	0.50 mm	Color-Black 50	Alignment - Limit of Construction
V-ALGN-MAJR	2	Continuous	0.35 mm	Black 35	Alignment - 100m Major Tics and Text
V-ALGN-MINR	1	Continuous	0.25 mm	Color-Black 25	Alignment - 20m Minor Tics
V-ALGN-NOTE	2	Continuous	0.35 mm	Black 35	Alignment - Notations
V-ALGN-TEXT	2	Continuous	0.35 mm	Black 35	Alignment - Major Labels (POTs, Pls, Curve Points)
V-ANNO-GRID	1	Continuous	0.25 mm	Color-Black 25	Annotation - Grid
V-ANNO-GRID-NRTH	2	Continuous	0.35 mm	Black 35	Annotation - Grid - North Arrow
V-ANNO-GRID-TEXT	1	Continuous	0.25 mm	Color-Black 25	Annotation - Grid - Text
V-ANNO-NOTE	2	Continuous	0.35 mm	Black 35	Annotation - General Survey Notes
V-ANNO-TEMP	7	Continuous	0.35 mm	Black 35	Annotation - Temporary Working Layer
V-COMM	133	Continuous	0.25 mm	Black 25	Telephone and Cable - Base Layer
V-COMM-CNDT	133	UG-TEL	0.25 mm	Black 25	Telephone and Cable - Underground Conduit
V-COMM-SYMB	133	Continuous	0.25 mm	Black 25	Telephone and Cable - Symbols
V-COMM-TEXT	133	Continuous	0.25 mm	Black 25	Telephone and Cable - Text
V-CTRL	1	Continuous	0.25 mm	Color-Black 25	Control - Base Layer
V-CTRL-GEOD	1	Continuous	0.25 mm	Color-Black 25	Control - Control Monument - Geodetic
V-CTRL-MAJR	1	Continuous	0.25 mm	Color-Black 25	Control - Major (Benchmark)
V-CTRL-MINR	1	Continuous	0.25 mm	Color-Black 25	Control - Minor (Intermediate Detail Hub)
V-CTRL-REFP	1	Continuous	0.25 mm	Color-Black 25	Control - Reference Point
V-CTRL-STAN	6	Continuous	0.25 mm	Color-Black 25	Control - Station on Offset Line
V-DRAIN	74	Continuous	0.25 mm	Black 25	Drainage - Base Layer
V-DRAIN-DTCH	74	Continuous	0.25 mm	Black 25	Drainage - Ditch
V-DRAIN-DTCH-CNTR	74	HYD-CNTR	0.25 mm	Black 25	Drainage - Ditch - Centre
V-DRAIN-DTCH-EDGE	74	HYD-DITCH	0.25 mm	Black 25	Drainage - Ditch - Edge
V-DRAIN-FLUM	74	Continuous	0.25 mm	Black 25	Drainage - Flume
V-DRAIN-GUTR	74	Continuous	0.25 mm	Black 25	Drainage - Gutter
V-DRAIN-PIPE	170	UG-PIPE	0.25 mm	Black 25	Drainage - Pipeline
V-DRAIN-PIPE-PLST	170	UG-PLASTIC	0.25 mm	Black 25	Drainage - Pipeline - Plastic
V-DRAIN-PIPE-SYMB	170	Continuous	0.25 mm	Black 25	Drainage - Pipeline - Symbols
V-DRAIN-RRAP	74	CONST-RRAP	0.25 mm	Black 25	Drainage - Riprap
V-DRAIN-SWAY	170	Continuous	0.25 mm	Black 25	Drainage - Spillway
V-IRRG	150	Continuous	0.25 mm	Color-Grey 60% 25	Irrigation - Base Layer
V-IRRG-SYMB	150	Continuous	0.25 mm	Color-Grey 60% 25	Irrigation - Symbols
V-IRRG-TEXT	150	Continuous	0.25 mm	Color-Grey 60% 25	Irrigation - Text
V-IRRG-UGND	150	UG-WATER	0.25 mm	Color-Grey 60% 25	Irrigation - Underground
V-NGAS	231	Continuous	0.25 mm	Black 25	Natural Gas - Base Layer

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NCS LAYER	COLOR	LINETYPE	WEIGHT	PLOT STYLE	DESCRIPTION (see notes at the bottom of the table)
V-NGAS-PIPE	231	UG-GAS	0.25 mm	Black 25	Natural Gas - Pipeline
V-NGAS-SYMB	231	Continuous	0.25 mm	Black 25	Natural Gas - Symbols
V-NGAS-TEXT	231	Continuous	0.25 mm	Black 25	Natural Gas - Text
V-OIL~	10	Continuous	0.25 mm	Black 25	Oil - Base Layer
V-OIL~-SYMB	10	Continuous	0.25 mm	Black 25	Oil - Symbols
V-OIL~-TEXT	10	Continuous	0.25 mm	Black 25	Oil - Text
V-OIL~-UGND	10	UG-OIL	0.25 mm	Black 25	Oil - Underground
V-POWR	210	Continuous	0.25 mm	Black 25	Electrical Power - Base Layer
V-POWR-CNDT	210	UG-ELEC	0.25 mm	Black 25	Electrical Power - Underground Conduit
V-POWR-SYMB	210	Continuous	0.25 mm	Black 25	Electrical Power - Symbols
V-POWR-TEXT	210	Continuous	0.25 mm	Black 25	Electrical Power - Text
V-PROP	50	Continuous	0.25 mm	Black 25	Legal Properties - Base Layer
V-PROP-BNDY	2	Continuous	0.35 mm	Black 35	Legal Properties - Boundary
V-PROP-BNDY-INTL	4	LOT-IB	0.70 mm	Color-Black 70	Legal Properties - International Boundary
V-PROP-ESMT	2	LOT-EA	0.35 mm	Black 35	Legal Properties - Easement
V-PROP-FNIR	253	Continuous	0.25 mm	Grey 60% 25	Legal Properties - First Nations Indian Reserve
V-PROP-GAZT	32	LOT-GB	0.25 mm	Black 25	Legal Properties - Gazette
V-PROP-LINE	50	Continuous	0.25 mm	Black 25	Legal Properties - Lines (Working)
V-PROP-PINS	1	Continuous	0.25 mm	Color-Black 25	Legal Properties - Pins and Markers
V-PROP-PRCL	50	Continuous	0.25 mm	Black 25	Legal Properties - Parcels, Legal Subdivisions
V-PROP-QTRS	3	LOT-QS	0.50 mm	Color-Black 50	Legal Properties - Quarter Section
V-PROP-RNAM	83	Continuous	0.25 mm	Black 25	Legal Properties - Road Names
V-PROP-RWAY	2	Continuous	0.35 mm	Black 35	Legal Properties - Right-of-way
V-PROP-SECT	4	LOT-SL	0.70 mm	Color-Black 70	Legal Properties - Section Line or District Lot
V-PROP-TEXT	10	Continuous	0.25 mm	Black 25	Legal Properties - Text - Group, Section, District Lot,
V-PROP-TEXT-ADRS	53	Continuous	0.25 mm	Black 25	Legal Properties - Text - Owner Address
V-PROP-TEXT-OWNR	74	Continuous	0.25 mm	Black 25	Legal Properties - Text - Owner
V-PROP-TEXT-PID~	10	Continuous	0.25 mm	Black 25	Legal Properties - Text - PID
V-RAIL	10	EXST-RAIL	0.25 mm	Black 25	Railway - Base Layer
V-RAIL-GRVL	83	EXST-	0.25 mm	Black 25	Railway - Gravel (Ballast)
V-ROAD	22	Continuous	0.35 mm	Grey 60% 35	Roads - Base Layer
V-ROAD-ARRW	22	Continuous	0.35 mm	Grey 60% 35	Roads - Direction Arrow
V-ROAD-ASPH	22	Continuous	0.35 mm	Grey 60% 35	Roads - Asphalt
V-ROAD-BARM-CABL	8	BAR-CABLE	0.25 mm	Grey 60% 25	Roads - Cable Barrier
V-ROAD-BARM-CONC	8	BAR-MB	0.25 mm	Grey 60% 25	Roads - Concrete Median Barrier
V-ROAD-BARM-GRAL	8	Continuous	0.25 mm	Grey 60% 25	Roads - Guard Rail Median Barrier
V-ROAD-BARR-CONC	8	BAR-RB	0.25 mm	Grey 60% 25	Roads - Concrete Roadside Barrier
V-ROAD-BARR-GRAL	8	BAR-GUARD	0.25 mm	Grey 60% 25	Roads - Guard Rail Roadside Barrier
V-ROAD-CNTR	22	ALGN-CNTR	0.35 mm	Grey 60% 35	Roads - Centreline
V-ROAD-CNTR-LLIN	22	ALGN-CNTR	0.35 mm	Grey 60% 35	Roads - Centreline (Location Line)
V-ROAD-CURB-ASPH	22	Continuous	0.35 mm	Grey 60% 35	Roads - Asphalt Curb
V-ROAD-CURB-CONC	8	Continuous	0.25 mm	Grey 60% 25	Roads - Concrete Curb / Gutter
V-ROAD-DIRT	22	EXST-DIRTROAD	0.35 mm	Grey 60% 35	Roads - Dirt
V-ROAD-DRIV	22	Continuous	0.35 mm	Grey 60% 35	Roads - Driveway
V-ROAD-GRVL	22	EXST-GRAVEL	0.35 mm	Grey 60% 35	Roads - Gravel
V-ROAD-GRVL-SHLD	22	ALGN-SHLD	0.35 mm	Grey 60% 35	Roads - Gravel Shoulder
V-ROAD-MRKG	53	Continuous	0.25 mm	Black 25	Roads - Pavement Marking
V-ROAD-MRKG-ARRW	53	Continuous	0.25 mm	Black 25	Roads - Pavement Marking - Direction Arrow
V-ROAD-MRKG-BRKN	53	ALGN-BWL	0.25 mm	Black 25	Roads - Pavement Marking - Broken White Line - Rural
V-ROAD-MRKG-DECL	53	ALGN-DECL	0.25 mm	Black 25	Roads - Pavement Marking - Deceleration Lane
V-ROAD-MRKG-URPL	53	ALGN-BWL-URB	0.25 mm	Black 25	Roads - Pavement Marking - Broken White Line -
V-ROAD-MRKG-WHIT	53	Continuous	0.25 mm	Black 25	Roads - Pavement Marking - White Line
V-ROAD-MRKG-XWLK	53	Continuous	0.25 mm	Black 25	Roads - Pavement Marking - Crosswalk
V-ROAD-MRKG-YELD	53	ALGN-DYL	0.25 mm	Black 25	Roads - Pavement Marking - Double Yellow Line
V-ROAD-MRKG-YELO	53	ALGN-YL	0.25 mm	Black 25	Roads - Pavement Marking - Yellow Line
V-ROAD-PVMT	22	Continuous	0.35 mm	Grey 60% 35	Roads - Pavement
V-ROAD-PVMT-CRCK	22	TOPO-CRACK	0.35 mm	Grey 60% 35	Roads - Pavement - Crack

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NCS LAYER	COLOR	LINETYPE	WEIGHT	PLOT STYLE	DESCRIPTION (see notes at the bottom of the table)
V-ROAD-PVMT-EDGE	22	Continuous	0.35 mm	Grey 60% 35	Roads - Edge of Pavement
V-ROAD-RAIS	22	Continuous	0.35 mm	Grey 60% 35	Roads - Raised Island
V-ROAD-REST	22	EXST-RESTAREA	0.35 mm	Grey 60% 35	Roads - Rest Area
V-ROAD-ROAD	22	EXST-ROAD	0.35 mm	Grey 60% 35	Roads - Road
V-ROAD-SCAL	22	Continuous	0.35 mm	Grey 60% 35	Roads - Weighscale
V-ROAD-SHLD	22	ALGN-SHLD	0.35 mm	Grey 60% 35	Roads - Shoulder Left/Right
V-ROAD-SWLK	22	Continuous	0.35 mm	Grey 60% 35	Roads - Sidewalk
V-ROAD-TOES	22	EXST-TOE	0.35 mm	Grey 60% 35	Roads - Toes
V-ROAD-XWLK	53	Continuous	0.25 mm	Black 25	Roads - Crosswalk
V-SIGN	8	Continuous	0.25 mm	Grey 60% 25	Signs - Base Layer
V-SIGN-TEXT	251	Continuous	0.13 mm	Grey 40% 13	Signs - Text
V-SITE	8	Continuous	0.25 mm	Grey 60% 25	General Site Features - Base Layer
V-SITE-ARCH	83	Continuous	0.25 mm	Black 25	General Site Features - Archaeological Site
V-SITE-BLDG	83	Continuous	0.25 mm	Black 25	General Site Features - Buildings
V-SITE-CGRD	8	Continuous	0.25 mm	Grey 60% 25	General Site Features - Cattle Guard
V-SITE-FENC	8	EXST-FENCE	0.25 mm	Grey 60% 25	General Site Features - Fence
V-SITE-GRVL	8	EXST-GRAVEL	0.25 mm	Grey 60% 25	General Site Features - Gravel
V-SITE-HOGF	8	CONST-HOGF	0.25 mm	Grey 60% 25	General Site Features - Hog Fuel
V-SITE-MISC	8	Continuous	0.25 mm	Grey 60% 25	General Site Features - Miscellaneous
V-SITE-VEGE	116	EXST-VEG	0.25 mm	Grey 60% 25	Vegetation - Base Layer
V-SITE-VEGE-BUSH	116	EXST-TREELINE	0.25 mm	Grey 60% 25	Vegetation - Bushes and Hedges
V-SITE-VEGE-CLGR	116	CONST-CLGR	0.25 mm	Grey 60% 25	Vegetation - Clearing and Grubbing
V-SITE-VEGE-PLNT	116	Continuous	0.25 mm	Grey 60% 25	Vegetation - Plants
V-SITE-VEGE-TREE	116	Continuous	0.25 mm	Grey 60% 25	Vegetation - Trees
V-SITE-VEGE-TROW	116	EXST-TREELINE	0.25 mm	Grey 60% 25	Vegetation - Tree Lines
V-SITE-VEGE-TURF	116	EXST-VEG	0.25 mm	Grey 60% 25	Vegetation - Lawn
V-SSWR	32	Continuous	0.25 mm	Black 25	Sanitary Sewer - Base Layer
V-SSWR-FORC	32	Continuous	0.25 mm	Black 25	Sanitary Sewer - Force Main
V-SSWR-FORC-PIPE	32	Continuous	0.25 mm	Black 25	Sanitary Sewer - Force Main - Pipeline
V-SSWR-FORC-SYMB	32	Continuous	0.25 mm	Black 25	Sanitary Sewer - Force Main - Symbols
V-SSWR-FORC-TEXT	32	Continuous	0.25 mm	Black 25	Sanitary Sewer - Force Main - Text
V-SSWR-PIPE	32	UG-SAN	0.25 mm	Black 25	Sanitary Sewer - Pipeline
V-SSWR-SYMB	32	Continuous	0.25 mm	Black 25	Sanitary Sewer - Symbols
V-SSWR-TEXT	32	Continuous	0.25 mm	Black 25	Sanitary Sewer - Text
V-STRC	11	Continuous	0.25 mm	Black 25	Structures - Base Layer
V-STRC-BRDG	11	Continuous	0.25 mm	Black 25	Structures - Bridge
V-STRC-SITE	11	Continuous	0.25 mm	Black 25	Structures - General Site Features
V-STRC-WALL	11	Continuous	0.25 mm	Black 25	Structures - Wall
V-STRC-WALL-BINW	11	WALL-EXIST	0.25 mm	Black 25	Structures - Wall - Bin
V-STRC-WALL-HEAD	11	WALL-EXIST	0.25 mm	Black 25	Structures - Wall - Head
V-STRC-WALL-RETN	11	WALL-EXIST	0.25 mm	Black 25	Structures - Wall - Retaining
V-STRC-WALL-WING	11	WALL-EXIST	0.25 mm	Black 25	Structures - Wall - Wing
V-STRM	90	Continuous	0.25 mm	Black 25	Storm Sewer - Base Layer
V-STRM-PIPE	90	UG-DRAIN	0.25 mm	Black 25	Storm Sewer - Pipeline
V-STRM-SYMB	90	Continuous	0.25 mm	Black 25	Storm Sewer - Symbols
V-STRM-TEXT	90	Continuous	0.25 mm	Black 25	Storm Sewer - Text
V-SURV-BNDY	253	EXST-TOE	0.25 mm	Grey 60% 25	General Survey - Survey Boundary
V-SURV-SPOT	135	Continuous	0.25 mm	Black 25	General Survey - Spot Elevations
V-SURV-SPOT-<KCFC>	135	Continuous	0.25 mm	Black 25	General Survey - Spot Elevations - Feature Code
V-TOPO	155	Continuous	0.25 mm	Grey 60% 25	Topographic - Base Layer
V-TOPO-BERM	155	CONST-BERM	0.25 mm	Grey 60% 25	Topographic - Berm in Cut or Fill
V-TOPO-BOTB	155	TOPO-BSLP	0.25 mm	Grey 60% 25	Topographic - Bottom of Slope / Bank
V-TOPO-BRKL	155	Continuous	0.25 mm	Grey 60% 25	Topographic - Break in Ground Line
V-TOPO-CRCK	155	TOPO-CRACK	0.25 mm	Grey 60% 25	Topographic - Ground Crack
V-TOPO-MAJR	253	Continuous	0.25 mm	Grey 60% 25	Topographic - Major Contours
V-TOPO-MINR	251	Continuous	0.13 mm	Grey 40% 13	Topographic - Minor Contours
V-TOPO-MISC	2	Continuous	0.35 mm	Black 35	Topographic - Miscellaneous (Unidentified)

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NCS LAYER	COLOR	LINETYPE	WEIGHT	PLOT STYLE	DESCRIPTION (see notes at the bottom of the table)
V-TOPO-PROF	2	Continuous	0.35 mm	Black 35	Topographic - Terrain Profile
V-TOPO-ROCK-BRCK	155	TOPO-TALUS	0.25 mm	Grey 60% 25	Topographic - Base of Rock
V-TOPO-ROCK-BRKL	155	Continuous	0.25 mm	Grey 60% 25	Topographic - Break Lines
V-TOPO-ROCK-BRKN	155	TOPO-TALUS	0.25 mm	Grey 60% 25	Topographic - Broken Rock
V-TOPO-ROCK-HRZA	2	TOPO-HORIZON-A	0.35 mm	Black 35	Topographic - Type A Horizon
V-TOPO-ROCK-LOOS	155	TOPO-TALUS	0.25 mm	Grey 60% 25	Topographic - Loose Rock
V-TOPO-ROCK-MISC	155	Continuous	0.25 mm	Grey 60% 25	Topographic - Other Solid Rock
V-TOPO-ROCK-OVBK	155	Continuous	0.25 mm	Grey 60% 25	Topographic - Overbreak
V-TOPO-ROCK-SOLD	155	TOPO-ROCK	0.25 mm	Grey 60% 25	Topographic - Solid Rock
V-TOPO-ROCK-TRCK	155	TOPO-ROCK	0.25 mm	Grey 60% 25	Topographic - Top of Rock
V-TOPO-SAND	155	TOPO-SAND	0.25 mm	Grey 60% 25	Topographic - Sand
V-TOPO-SLGH	155	TOPO-SLIDE	0.25 mm	Grey 60% 25	Topographic - Slough / Talus
V-TOPO-SPCL	251	Continuous	0.13 mm	Grey 40% 13	Topographic - Special Contours
V-TOPO-TALS	155	TOPO-TALUS	0.25 mm	Grey 60% 25	Topographic - Talus
V-TOPO-TOPB	155	TOPO-TSLP	0.25 mm	Grey 60% 25	Topographic - Top of Slope / Bank
V-TOPO-TRAL	155	TOPO-TRAIL	0.25 mm	Grey 60% 25	Topographic - Trail (Mapping Requirement)
V-TOPO-WAST	155	CONST-WASTE	0.25 mm	Grey 60% 25	Topographic - Waste
V-TOPO-WATR-CNTR	5	HYD-CNTR	0.25 mm	Color-Grey 60% 25	Topographic - Water - Narrow Water (Creek, Stream)
V-TOPO-WATR-EDGE	5	HYD-EW	0.25 mm	Color-Grey 60% 25	Topographic - Water - Wide Water Edge
V-TOPO-WATR-EHWM	5	HYD-HWE	0.25 mm	Color-Grey 60% 25	Topographic - Water - Extreme High Water Mark
V-TOPO-WATR-FDPL	5	Continuous	0.25 mm	Color-Grey 60% 25	Topographic - Water - Flood Plain (High Water Mark)
V-TOPO-WATR-HIGH	5	HYD-HW	0.25 mm	Color-Grey 60% 25	Topographic - Water - High Water Mark
V-TOPO-WATR-OBJT	155	Continuous	0.25 mm	Grey 60% 25	Topographic - Water - Objects (Ice, Log Jam)
V-TOPO-WATR-SEEP	5	HYD-SEEP	0.25 mm	Color-Grey 60% 25	Topographic - Water - Seepage
V-TOPO-WATR-STRE	5	HYD-CNTR	0.25 mm	Color-Grey 60% 25	Topographic - Water - Stream
V-TOPO-WETL	155	TOPO-MARSH	0.25 mm	Grey 60% 25	Topographic - Wetlands (Swamp / Marsh)
V-UTIL	200	Continuous	0.25 mm	Grey 60% 25	Miscellaneous Utilities - Base Layer
V-UTIL-SYMB	200	Continuous	0.25 mm	Grey 60% 25	Miscellaneous Utilities - Symbols
V-UTIL-TEXT	200	Continuous	0.25 mm	Grey 60% 25	Miscellaneous Utilities - Text
V-UTIL-UGND	200	UG-MISC	0.25 mm	Grey 60% 25	Miscellaneous Utilities - Underground
V-WATR	150	Continuous	0.25 mm	Color-Grey 60% 25	Water - Base Layer
V-WATR-PIPE	150	UG-WATER	0.25 mm	Color-Grey 60% 25	Water - Pipeline
V-WATR-SYMB	150	Continuous	0.25 mm	Color-Grey 60% 25	Water - Symbols
V-WATR-TEXT	150	Continuous	0.25 mm	Color-Grey 60% 25	Water - Text

Shaded rows are example layer names only and are used to create unique layers for specific feature codes or alignments as needed. The alignment name is added as a minor group code and may be longer than the allowed 4 character limit. In the case of a feature code used as a minor group code, tilde characters (~) are to be added as required to fill out the code to 4 characters.

The current Highway Engineering AutoCAD Drafting Standards download (see [Section 1240](#)) contains a spreadsheet and an AutoCAD DWT template. Both the spreadsheet and the template will always contain the latest list of layers along with a complete description for each layer. The layer names and descriptions can be found in the "NCS Layers" worksheet and the AutoCAD **Layer Properties Manager** dialog. Please note that the above list may be updated only occasionally and page size constraints limit the layer descriptions in some cases.

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1240 AUTOCAD STANDARDS

1240.01 INTRODUCTION

This section details a number of general AutoCAD techniques and property settings related to the BC Ministry of Transportation and Infrastructure, Highway Engineering, CAD standards.

1240.02 REQUIRED FILES

For consultants, the ministry Highway Engineering [AutoCAD Drafting Standards](#) may be downloaded from the ministry's AutoCAD Resources web page.

1240.03 BYLAYER PROPERTIES

General properties assigned to all AutoCAD entities include: Layer, Colour, Linetype, Lineweight, Plot Style and Transparency.

The ministry has now adopted a stricter ByLayer standard which allows the layer table to control the appearance of all drawing entities.

Each layer is assigned a colour, linetype, lineweight, plot style and transparency. The associated drawing entity properties should always be assigned the value "ByLayer".

Object Properties Assignment	
Layer	Select layer from list
Colour	ByLayer
Linetype	ByLayer
Lineweight	ByLayer
Plot Style	ByLayer
Transparency	ByLayer

Exceptions for Blocks

Multiple colour block inserts such as the standard titleblock contain several colours and lineweights.

The internal block entities do not require separate layer on/off control and are therefore assigned specific colours, lineweights and plot styles.

Other Exceptions

Deviations from this standard should be an exception and not the rule.

As the standard evolves, certain items may be listed as common exceptions. Requirements for exceptions should be reported to the ministry.

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1240.04 TEXT STYLES

Four text styles are defined in the standard drawing template:

Standard	Font = RomanS.shx, Height = 0
Arial	Font = Arial, Height = 0
ArialBold	Font = Arial (Bold), Height = 0
BC Symbol	Font = Arial, Height = 0

The **Arial** style should be used where text weight is required for emphasis. The **Arial** font proportionally increases in weight as the height increases, the line weight of the plot style is not a factor. This significantly reduces the need for multi-coloured text and therefore the need for extra layers or individually coloured text.

The bold **Arial** style may be used where additional emphasis is required.

The Standard style (**RomanS.shx**) may be used for text heights ≤ 2.5 mm where on-screen clarity of the text is desired, or performance is improved with a larger number of text entities (e.g. grid point or contour labels).

The **BC Symbol** style is used by most of the standard symbols (see [Section 1250](#)). The use of a separate style name allows for a quick change from the **Arial** font to **RomanS.shx** without the need to edit all of the individual blocks.

Use of the ministry **Highways.shx** font is no longer permitted and this font file is supplied only in order to support existing drawings.

1240.05 TEXT SCALING AND STANDARD HEIGHTS

AutoCAD's annotation scaling features should be used as opposed to creating separate text layers for labelling at multiple scales. The text justification position (e.g. Center) should be set to avoid unwanted label movement due to annotation scaling. All text heights in this section are specified for 1:1000 scale plots.

Standard text heights include 1.8 mm, 2.5 mm, 3.5 mm, 5.0 mm and 7.0 mm. The **Arial** styles/font will adjust the weight of the text automatically depending on the height and the plot style line weight will be ignored. Therefore, there are no longer specific colors/weights assigned to the various standard text heights.

However, if the **RomanS.shx** font is used for 1.8 mm text, the plot style should assign a 0.18 mm or 0.25 mm line weight. A 0.25 mm weight should be used for 2.5 mm text. **RomanS.shx** should not be used for 3.5 mm, 5.0 mm or 7.0 mm text.

Refer to the following sections and the sample drawings in [Section 1220](#) for information on heights for specific types of text.

Adjusting Text Heights for the Arial Font

The heights listed in this section are the standard text heights traditionally used with the **RomanS.shx** font. As the **Arial** font may not be as readable at these sizes (especially on 11x17 plots), it is permissible to increase the standard text heights as shown.

Standard Text Heights (RomanS.shx) (1:1000)	Alternate Text Heights for Arial Font (1:1000)
1.8 mm	2.1 mm
2.5 mm	3.0 mm
3.5 mm	4.0 mm
5.0 mm	6.0 mm
7.0 mm	8.5 mm
10.0 mm	12.0 mm

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1240.06 GENERAL ANNOTATION – TEXT HEIGHTS

Description	Layer	Height (1:1000)
Miscellaneous Notes	G-ANNO-NOTE, G-ANNO-TEXT	Varies
Titleblock - Ministry Name	G-ANNO-TTLB-TEXT	3.7
Titleblock - Branch/Office Name	G-ANNO-TTLB-TEXT	3.0
Titleblock - Name/Type of Sheet	G-ANNO-TTLB-TEXT	5.0
Titleblock - Highway/Project Description	G-ANNO-TTLB-TEXT	3.5
Titleblock - Stationing, Scale for Sheet	G-ANNO-TTLB-TEXT	2.5
Titleblock - File, Project, Region, Drawing Number, Revision	G-ANNO-TTLB-TEXT	3.5
Titleblock - Revision Details, Signature Date	G-ANNO-TTLB-TEXT	2.0
Titleblock - CAD Filename/Date, Designed, Drawn, QA, QC	G-ANNO-TTLB-TEXT	1.8

1240.07 EXISTING PLAN DETAIL – TEXT HEIGHTS

Description	Layer	Height (1:1000)
Grid Point (N/E labels)	V-ANNO-GRID	1.8
Lot Description	V-PROP-TEXT	3.5
Plan Number	V-PROP-TEXT	5.0
District Lot Description	V-PROP-TEXT	7.0/10.0
Quarter Section Description	V-PROP-TEXT	7.0 Bold
Municipal Description	V-PROP-TEXT	5.0
Range Description	V-PROP-TEXT	5.0
Township Description	V-PROP-TEXT	3.5
Contours	V-TOPO-MAJR	2.5 Fine/Grey
Instrumentation	B-ANNO-TEXT	2.5 Bold
Sign Information	V-SIGNS	Varies
Spot Elevations	V-SURV-SPOT	1.8

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1240.08 PROPOSED PLAN DETAIL – TEXT HEIGHTS

Description	Layer	Height (1:1000)
Culvert Note	C-DRAN-TEXT	2.5 Italic
Catch Basin Notes	C-DRAN-TEXT	2.5
Drainage Notes	C-DRAN-TEXT	2.5
Insets - Titles	G-ANNO-DETL	Varies
Insets - General	G-ANNO-DETL-TEXT	Varies
Curve Geometry/Points (Secondary Roads, Access, Quadrants)	C-ALGN-NOTE	2.5
Tangent Azimuth, Distance	C-ALGN-ANNO	2.5
100m Stations	C-ALGN-MAJR	2.5 Bold
POTs , POSTs, etc.	C-ALGN-TEXT	2.5
PI, BC, EC, TS, SC, CC, CS, ST, etc.	C-ALGN-TEXT	3.5
PI Boxed Coordinates	C-ALGN-ANNO	1.8
Alignment Curve Data	C-ALGN-CURV	3.5
Limits of Construction (Main Line)	C-ALGN-LOCN	5.0
Limits of Construction (Secondary Line)	C-ALGN-LOCN	3.5
Abutment Stations	C-ALGN-ANNO	2.5 Bold
Alignment Text	C-ALGN-NOTE	2.5
Lane Width	C-ALGN-NOTE	Varies
Notation Paint Lines	C-ALGN-NOTE	2.5
Notation Pavement Edge	C-ALGN-NOTE	2.5
Notation Shoulder	C-ALGN-NOTE	2.5
Notation Begin/End Taper	C-ALGN-NOTE	2.5
Notation Begin/End Barrier	C-ALGN-NOTE	2.5
Design Notes – Boxed Notes (Remove, Abandon, etc.)	G-ANNO-NOTE	Varies
Design Notes – Other	G-ANNO-NOTE	Varies
Match Lines	G-ANNO-NOTE	1.8
Construction Notes	G-ANNO-NOTE	2.5/3.5
Construction Notes Title	G-ANNO-NOTE	Varies
Offset/Station to Proposed Right-of-Way	V-PROP-RWAY	3.5
Right-of-Way Boxed Areas	V-PROP-RWAY	2.5 Bold
Right-of-Way Sheet Summary (R/W Required, etc.)	V-PROP-RWAY	2.5 Bold
Offset/Station Clearing and Grubbing	V-PROP-RWAY	2.5
Clearing and Grubbing Areas	V-PROP-RWAY	2.5 Bold
Limits (Clearing and Grubbing Notes)	V-PROP-RWAY	2.5
Offset/Station to Disposal Area	V-PROP-RWAY	2.5
Summary (Clearing and Grubbing)	V-PROP-RWAY	2.5 Bold
Sign Symbol Text	C-SIGN-TEXT	2.5
Sign Box Title (Summary)	C-SIGN-TEXT	3.5
Sign Box Text (Summary)	C-SIGN-TEXT	2.5
Spot Elevation Text	C-TOPO-SPOT	1.8 or 2.5
Bridge Text	C-STRC-BRDG	2.5
Cut and Fill Notation	C-ROAD-TOES	2.5

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1240.09 TYPICAL CROSS SECTIONS – TEXT HEIGHTS

Description	Layer	Height (1:1000)
Section Title	C-SECT	5
Section Subtitle	C-SECT	3.5
Dimensions	C-SECT	2.5
Descriptive Text	C-SECT	2.5
Notes	G-ANNO-NOTE	Varies
Insets - Titles	G-ANNO-DETL	Varies
Insets - General	G-ANNO-DETL-TEXT	Varies

1240.10 CROSS SECTIONS – TEXT HEIGHTS

Description	Layer	Height (1:1000)
Grid Labels	C-SECT-GRID-MAJR	2.5
Stationing	G-ANNO-NOTE	7
Elevations	G-ANNO-NOTE	5
Notations	G-ANNO-NOTE	2.5

1240.11 PROFILES – TEXT HEIGHTS

Description	Layer	Height (1:1000)
L.B.M. Description	C-PROF-GRID-LABL	2.5 Bold
Elevations and Stations	C-PROF-GRID-LABL	3.5
Quantities	C-PROF-QUAN	3.5
Top Sheet Files (Excavation, Embankment, etc.)	C-PROF-QUAN	3.5
Existing Utility Information	C-PROF-EXST-UTIL	2.5
Culvert Description	C-PROF-DRAN	2.5 Italic
Ditching Description	C-PROF-DRAN	2.5
Horizontal Alignment Data	C-PROF-HORZ-TEXT	2.5
Construction Notes	G-ANNO-NOTE	2.5
Design Speed	G-ANNO-NOTE	5
Notes	G-ANNO-NOTE	3.5 Bold
Profile Data	C-PROF-ALGN-TEXT	3.5
Limit of Construction	C-PROF-HORZ-LOCN	5
Insets - Titles	G-ANNO-DETL	Varies
Insets - General	G-ANNO-DETL-TEXT	Varies

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1240.12 PLOT STYLES

Named Plot Styles (STB Drawings)

The ministry now uses named plot styles (STB) as opposed to colour-dependant plot styles (CTB).

The setting that controls the plot style type (CTB or STB) is stored in the drawing file (DWG).

The ministry drawing template (DWT), containing the layers, linetypes and symbols as described in this chapter, uses named plot styles (STB). When this template is used as the basis for a new drawing, only STB files will be visible in the plot dialog.

Choosing STB/CTB Files for Printing

If a named plot style drawing is active in AutoCAD, the PLOT command dialog will show a list of STB files. If an older colour-dependant drawing is active, the dialog will show a list of CTB files.

Converting Drawings

Drawings may be converted from CTB to the new STB standard or vice versa via the CONVERTPSTYLES command. A file named **BC MoT STB Conversion.stb** is provided for this purpose.

The conversion is not recommended due to the amount of work involved and the potential for errors. Each item in the drawing would have to be checked to ensure the correct layer, colour, linetype and plot style were assigned. This may include internal block entities.

STB and CTB Comparison

CTB files contain a list of the 255 AutoCAD colours and a plotting configuration for each. The CTB file defines how the entities using each colour will plot.

STB files contain a shorter list of plot style names and a plotting configuration for each. The STB file defines how the entities assigned to a particular plot style name will plot. As with CTB files, one STB can be used to plot everything as black/grey while another could be created to plot in colour with half-width line weights.

Colours and plot style names are usually assigned per layer in modern drawings and that is the standard for ministry drawings.

Named Plot Style Details

A descriptive plot style name from a fairly short list is assigned to each layer. The layer table is the primary control for plotting style.

All model and paper space entities have their Plot Style name set to ByLayer.

One feature of the STB system is that layers or entities may be assigned any plot style regardless of the display colour. One yellow layer may be assigned to plot black while another yellow layer may be assigned to plot yellow. This also applies to entities.

For consistency and ease of use, the default plot styles ensure that all layers of a certain color will print with the same plot style. This allows the CAD operator to easily correlate the screen colour to the plot colour in the same way that the CTB system used to work.

Overriding Plot Styles

In certain cases, such as a presentation drawing, it may be desirable to plot most of the drawing in the standard black/grey shades and highlight a few items in color.

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It is permissible to alter the default plot style for an individual layer or entity to accomplish this. For example, if the C-ALGN layer plot style is changed from **Color-Black 70** to **Color 70** then the main alignment will show up in CYAN even though the **BC MoT Black Grey.stb** file is used.

One method for doing this would be to create a new layout and assign the plot style in the **VP Plot Style** column. This avoids altering the main **Plot Style** for that particular layer. The **VP Plot Style** column is only available in AutoCAD 2010 and newer versions.

BC MoT Plot Style Tables

There are four standard STB files that control how each plot style name is interpreted. The STB file is assigned to the layout in the plot dialog. Multiple layouts may be created for color, black, full-size or half-size plots.

Any of these tables may be assigned to the drawing in the model tab with the PLOTSTYLE command or via the Properties palette. All STB files must contain the same plot style names.

BC MoT Black Grey.stb – full size black/grey plots

BC MoT ½ Size Black Grey.stb – half size black/grey

BC MoT Color.stb – full size colour plots

BC MoT ½ Size Color.stb – half size colour plots

BC MoT Plot Style Names

The ministry has defined 30 plot style names. The examples below demonstrate how the names are interpreted. The last number (25, 35, 50, 70) always indicates the line weight on a full size plot: 25 = 0.25 mm, 35 = 0.35 mm. A weight of 25 is 0.25 mm when using the full size STB files and 0.13 mm for the half size STB files.

Black 25

Layers or entities using this plot style will print black no matter which STB file is selected. The weight will be 0.25 mm or 0.13 mm depending on which STB file is attached (full size or ½ size).

Color-Black 50

The on-screen colour will be used for a colour STB and black will be used for a black/grey STB. The weight will be 0.50 mm or 0.25 mm.

Color-Grey 60% 35

Same as above except 60% grey for a black/grey STB file. The weight will be 0.35 mm or 0.18 mm.

Color-Greyscale 50

The on-screen colour will be used for a colour STB and a greyscale equivalent will be used for a black/grey STB. The weight will be 0.50 mm or 0.25 mm.

Color 70

The “Color 70” plot style will always print using the on-screen colour. This is an example of a plot style that could be used to add some colour to an otherwise black/grey plot. In other words, if a black/grey STB file is attached, this style will override and provide colour output.

Plotting Results

The choice of STB file in the PLOT dialog (and the definitions inside the file) and the selection of plot style name in the layer dialog (and occasionally per entity) together determine the colour and weight of the plotted output.

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1240.13 SCREENING EXISTING DETAIL

Changing the plot style of existing detail layers to print them in a shade of grey will produce a screening effect that ensures the proposed detail is the most prominent while providing legible existing detail.

Existing detail should be contained in separate drawings and externally referenced into the design drawings both for drawing integrity and for performance reasons. With this method, the plot style of the existing detail x-ref layers may be altered to force the detail to print in a shade of grey. This will not affect the default plot style for these layers as stored in the external drawing.

Newer versions of AutoCAD allow the plot style of a layer to be adjusted separately for each layout viewport. With this capability, the existing detail can remain integrated into the design drawing if necessary. The default plot style for these layers will be displayed in the main **Plot Style** column of the layer table and the printed plot styles can be adjusted for screening within the individual layouts using the **VP Plot Style** column.

1240.14 PLOTTING AND PRINTING OF FULL SIZE TENDER CONTRACT DRAWINGS

The cost to print full size colour drawings is about four times the cost of black and grey prints. The printing cost is passed on to the construction companies that must purchase the tender documents prior to bidding. Therefore, due to the substantial cost of colour printing, final full size tender contract drawings will be printed in black and grey by the Queen's Printer, regardless of whether there are colour images on the plotted drawings.

For final full size tender contract drawings, it is unacceptable for text annotation and line work to be plotted in colour. This is because when the drawings are printed in black and grey, the lighter colours may become illegible or will become a shade of grey. This could make the drawing difficult to understand since some colours are supposed to plot in black (typically for proposed detail) but would appear grey (which is for existing detail). The drawings are to be plotted in AutoCAD with the appropriate black/grey plot style.

For final full size tender contract drawings, colour may be used to show GIF format images of the signs that are to be installed on a project. Colour GIF images are not a problem since the images are still legible when printed in black and grey.

Plotting in colour is acceptable for design reviews and presentation purposes (i.e. pre-tender stage drawings).

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1250 AUTOCAD SYMBOLS

1250.01 INTRODUCTION

The Ministry Engineering Branch has developed standard symbols to represent existing features as picked up in a field survey, as well as design features that must be shown on contract drawings. This includes the usual assortment of notes, bar scales, arrows, etc.

Where appropriate, the survey symbols have been selected from standards set by the BC Surveyor General's Office.

A drawing template containing the symbols and other supplied files are available for consultant download as described in [Section 1240](#).

The symbols have been grouped into categories in the following subsections:

Survey Symbols	1250.02
Aerial Utilities	1250.03
Detail	1250.04
Drainage	1250.05
Proposed Drainage	1250.06
Underground	1250.07
Electrical	1250.08
Meters	1250.09
Road Signs	1250.10
Lane Arrows	1250.11
Miscellaneous Arrows	1250.12
Roundabout Lane Arrows	1250.13
Construction Notes	1250.14
Miscellaneous Notes	1250.15
Geotech Legends	1250.16
Geotech General	1250.17
Geotech Pit Development	1250.18
Titleblocks and Frames	1250.19

Block Definitions

All **internal entities** are assigned **ByBlock** attributes with some exceptions noted below.

Block **insertions** are to be assigned standard **ByLayer** properties (see [Section 1240.02](#)) and will take on the properties of the assigned layer.

Non-Standard Blocks

A number of the supplied blocks require multiple line weights. The complete list of multi-colour blocks is as follows:

- Titleblocks: frame, titleblocks
- Ministry Logos: bclogo
- Provincial Logos: motlogo, motlogo_color
- Front Pages: frontpg, frontpg_color
- Regional/District Maps: bcmaps
- Geotechnical Legends: leg-soil, leg-pit, leg-th
- Geotechnical Keymap: keymap

The internal entities of these blocks may be assigned specific layers, colours and plot styles.

Blocks with Attributes and Text

A number of blocks include adjustable attributes:

PROFNOTE, DESSPEED, SPLATE, PIEZMTR, SLOPE, TESTHOLA, TESTPITA, FEATURE, HUB, TITLEBLOCKS

Text in the titleblock, legend and note blocks use the **Arial** text style.

All other symbols containing text or attributes are assigned a text style named **BC Symbol**. The default font for this style is Arial. This may be adjusted to RomanS.shx if necessary.

Dynamic Blocks

The following dynamic blocks have been created:

TITLEBLOCKS contains all of the standard titleblocks, use the grip or the Properties palette to select the type (standard, low profile horizontal, ...).

SCALES includes all standard scales with an insertion point that can be attached to a vertex endpoint on the TITLEBLOCKS block. The orientation may be adjusted to support the vertical titleblock.







BCLOGO and BCMAPS are similar to SCALES and include options for a color or black-grey logo and various regional and district maps.

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1250.02 SURVEY SYMBOLS















Symbol	Name	Feature	Description	Layer
	INDEFELV	IE	Indefinite Elevation <i>mapping requirement</i>	V-TOPO-MISC
	MSRD-PNT	PM	Unmarked Measured Point	V-TOPO-MISC
	SPOT-ELV	SE PSE	Spot Elevation	V-SURV-SPOT C-TOPO-SPOT
	ALM-POST	AP	Aluminum Post	V-PROP-PINS
	ANGL-IRN	AI	Angle Iron Post	V-PROP-PINS
	BRAS-CAP	BCM	Standard Brass Cap Monument	V-PROP-PINS
	CON-POST	MN	Concrete Post Monument <i>brass cap on 75 cm tall concrete cylinder</i>	V-PROP-PINS
	DOMIN-IP	DIP	Dominion Iron Post	V-PROP-PINS
	IRON-PIN	IP	Standard Iron Pin	V-PROP-PINS
	LED-PLUG	LP	Lead Plug	V-PROP-PINS
	ROK-POST	RPM	Rock Post Monument	V-PROP-PINS
	ROUND-IP	RIP	Non-Standard Round Iron Post	V-PROP-PINS
	SQUAR-IP	SIP	Non-Standard Square Iron Post	V-PROP-PINS
	WIT-POST	WP	Witness Post	V-PROP-PINS
	WOODPOST	WN	Wooden Post	V-PROP-PINS

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Symbol	Name	Feature	Description	Layer
	REFPOINT	RP	Reference Point	V-CTRL-REFP
	DETALHUB	DH	Detail / Traverse Hub	V-CTRL-MINR
	BENCHMRK	BM	Benchmark	V-CTRL-MAJR
	MONUMENT	LM	Control Monument <i>geodetic benchmark</i> <i>integrated survey monument</i>	V-CTRL-GEOD
	TESTPIT	TT	Geotechnical Test Pit	B-BORE-SYMB-TPIT
	TESTHOLE	AH BRH TH	Geotechnical Auger Hole Geotechnical Borehole Geotechnical Test Hole	B-BORE-SYMB-HOLE B-BORE-SYMB-HOLE B-BORE-SYMB-THOL













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1250.03 AERIAL UTILITIES

Symbol	Name	Feature	Description	Layer
	T-BOOTH	PB	Telephone Booth	V-COMM-SYMB C-COMM-SYMB
	TEL-GUY	GT	Phone Guy Pole	V-COMM-SYMB C-COMM-SYMB
	TEL-PEDL	PD	Telephone Pedestal	V-COMM-SYMB C-COMM-SYMB
	TEL-POLE	TP	Telephone Pole	V-COMM-SYMB C-COMM-SYMB
	POWR-GUY	GE	Power Guy Pole	V-POWR-SYMB
	HT-POLE	HV	High Tension Pole	V-POWR-SYMB C-POWR-SYMB
	HT-TOWER	HT	High Tension Tower	V-POWR-SYMB C-POWR-SYMB
	PT-GUY	GY	Power / Phone Guy Pole	V-POWR-SYMB C-POWR-SYMB
	PT-POLE	PT	Power / Telephone Pole	V-POWR-SYMB C-POWR-SYMB
	PWR-POLE	PP	Power Pole	V-POWR-SYMB C-POWR-SYMB
	TRNS-PT	PH	Power / Telephone Pole with Transformer	V-POWR-SYMB C-POWR-SYMB
	TRNS-PWR	PS	Power Pole with Transformer	V-POWR-SYMB C-POWR-SYMB
	DEADMAN	DM	Deadman	V-UTIL-SYMB C-UTIL-SYMB
	GUY-WIRE	AN or GW	Anchor or Guy Wire	V-UTIL-SYMB C-UTIL-SYMB











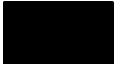


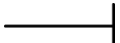
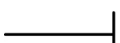
MoTI Section	1250		TAC Section	Not Applicable
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1250.04 DETAIL

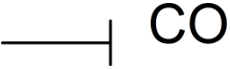

Symbol	Name	Feature	Description	Layer
	COM-SIGN	CSN PCSN	Commercial Sign	V-SIGN C-SIGN
	DELINPST	DO PDO	Delineator Post	V-SIGN C-SIGN
	CON-PILR	CN PCN	Concrete Pillar	V-SITE-MISC C-STRC-MISC
	FLAGPOLE	PF PPF	Flagpole	V-SITE-MISC C-STRC-MISC
	GARDPOST	PO PPO	Guard Post	V-SITE-MISC C-STRC-MISC
	GATEPOST	GA PGA	Gate Post	V-SITE-MISC C-STRC-MISC
	MAIL-BOX	MB PMB	Mailbox	V-SITE-MISC C-STRC-MISC
	DEC-TREE	DT	Decorative Tree	V-SITE-VEGE-TREE
	TREE	TE	Tree	V-SITE-VEGE-TREE
	PILING	PG PPG	Piling	V-STRC C-STRC-MISC
	SWAMP	MS	Swamp	V-TOPO-WETL
	WELL	W PW	Well	V-UTIL-SYMB C-UTIL-SYMB

MoTI Section	1250		TAC Section	Not Applicable
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1250.05 DRAINAGE











Symbol	Name	Feature	Description	Layer
	MANHOLE	MH	Existing Manhole	V-UTIL-SYMB
 MH Power	MH-POWER	MHP	Existing Manhole - Power	V-POWR-SYMB
 MH San	MH-SAN	MHS	Existing Manhole - Sanitary Sewer	V-SSWR-SYMB
 MH Storm	MH-STORM	MHM	Existing Manhole - Storm Sewer	V-STRM-SYMB
 MH Tel	MH-TEL	MHT	Existing Manhole - Telephone	V-COMM-SYMB
 MH Unk	MH-UNK	MHU	Existing Manhole - Unknown	V-UTIL-SYMB
 MH Vault	MH-VAULT	MHV	Existing Manhole - Vault	V-UTIL-SYMB
 MH Water	MH-WATER	MHW	Existing Manhole - Vault	V-WATR-SYMB
 MH/CB Drywell	DRYWELL	DRY	Existing Manhole/Catch Basin - Drywell	V-UTIL-SYMB
	CB	CB	Existing Catch Basin	V-STRM-SYMB
	CB-MH	CM	Catch Basin Manhole	V-STRM-SYMB
	ASP-SPLW	AS PAS	Asphalt Spillway	V-DRAN-SWAY C-DRAN-SWAY
	DRNGRATE	DG	Drainage Grate	V-STRM-SYMB
	CULVT	CUL	Culvert	V-DRAN-PIPE-SYMB
 CI	CULVTIN	CI	Culvert Inlet	V-DRAN-PIPE-SYMB

MoTI Section	1250		TAC Section	Not Applicable
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Symbol	Name	Feature	Description	Layer
	CULVTOUT	CO	Culvert Outlet	V-DRAN-PIPE-SYMB
	CUL-KINK	KK	Culvert Kink	V-DRAN-PIPE-SYMB










MoTI Section	1250		TAC Section	Not Applicable
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1250.06 PROPOSED DRAINAGE

Symbol	Name	Feature	Description	Layer
	PMANHOLE	MD	Proposed Manhole	C-UTIL-SYMB
 MH Power	PM-POWER	MDP	Proposed Manhole - Power	C-POWR-SYMB
 MH San	PM-SAN	MDS	Proposed Manhole - Sanitary Sewer	C-SSWR-SYMB
 MH Storm	PM-STORM	MDM	Proposed Manhole - Storm Sewer	C-STRM-SYMB
 MH Tel	PM-TEL	MDT	Proposed Manhole - Telephone	C-COMM-SYMB
 MH Unk	PM-UNK	MDU	Proposed Manhole - Unknown	C-UTIL-SYMB
 MH Vault	PM-VAULT	MDV	Proposed Manhole - Vault	C-UTIL-SYMB
 MH Water	PM-WATER	MDW	Proposed Manhole - Water	C-WATR-SYMB
 MH/CB Drywell	PDRYWELL	PDRY	Proposed Manhole/Catch Basin - Drywell	C-UTIL-SYMB
	PCB	PCB	Proposed Catch Basin	C-STRM-SYMB








MoTI Section	1250		TAC Section	Not Applicable
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1250.07 UNDERGROUND

Symbol	Name	Feature	Description	Layer
 BP	VENT	VP	Vent Pipe - Breather / Vent Pipe	V-OIL~-SYMB
 FC	FILL-CAP	FC	Filler Cap	V-OIL~-SYMB
 FP	GAS-PUMP	FU PFU	Fuel / Gas Pump Proposed Fuel / Gas Pump	V-OIL~-SYMB C-OIL~-SYMB
 FT	FUEL-TNK	FT PFT	Fuel Tank Proposed Fuel Tank	V-OIL~-SYMB C-OIL~-SYMB
 ST	SEPT-TNK	ST PST	Septic Tank Proposed Septic Tank	V-SSWR-SYMB C-SSWR-SYMB
 UM	UG-MRKER	UM	Underground Marker	V-UTIL-SYMB
 IJ	IRRGJBOX	IRJ	Irrigation - Junction Box	V-IRRG-SYMB
 IS	IRRGSPHD	IRS	Irrigation - Sprinkler Head	V-IRRG-SYMB
 XF	TRNS-FMR	UXF	Underground Electrical Transformer	V-POWR-SYMB C-POWR-SYMB









MoTI Section	1250		TAC Section	Not Applicable
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1250.08 ELECTRICAL

Symbol	Name	Feature	Description	Layer
 JB	JUNC-BOX	JB	Junction Box	V-UTIL-SYMB
 UP	UTIL-POL	UP	Utility Pole	V-UTIL-SYMB
 EO	ELE-OUTL	EO	Electrical Outlet	V-POWR-SYMB
 LS	LAMPSTND	LA	Lamp Standard	V-POWR-SYMB
 K	KIOSK	K	Utility Kiosk	V-UTIL-SYMB
 SN PSN	TRAF-SIG	SN PSN	Signal - Traffic Signal Proposed Signal - Traffic Signal	V-UTIL-SYMB C-UTIL-SGNL
 TA PTA	TRAFCNTR	TA PTA	Traffic Counter Proposed Traffic Counter	V-UTIL-SYMB C-UTIL-SGNL
 TX PTX	CONT-BOX	TX PTX	Traffic Signal Control Box Proposed Traffic Signal Control Box	V-UTIL-SYMB C-UTIL-SGNL


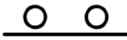

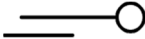
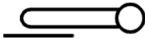
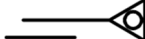
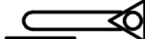


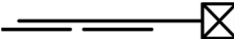
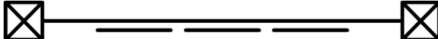
MoTI Section	1250		TAC Section	Not Applicable
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1250.09 METERS

Symbol	Name	Feature	Description	Layer
	VALVE	V	Valve	V-UTIL-SYMB
	SERV-MTR	SV	Meter - Service Meter	V-UTIL-SYMB
	GAS-VALV	GV	Gas Valve	V-NGAS-SYMB
	WATRVALV	WV	Valve - Water Valve	V-WATR-SYMB
	WATR-MTR	WM	Meter - Water Meter	V-WATR-SYMB
	FIRE-HYD	FH	Fire Hydrant	V-WATR-SYMB
	STANPIPE	SDP	Standpipe - Water Blowoff	V-WATR-SYMB C-WATR-SYMB
	AIR-VALV	AR	Valve - Air Release Valve	V-UTIL-SYMB











MoTI Section	1250		TAC Section	Not Applicable
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1250.10 ROAD SIGNS


Symbol	Name	Description	Layer
	ONE-POST	One Post (wood / perforated square steel / round steel)	V-SIGN
	TWO-POST	Two Post (wood / perforated square steel)	V-SIGN
	BRKAWAY	Breakaway (steel)	V-SIGN
	TYPE-3	Standard Davit Pole - Type 3	V-SIGN
	TYPE-1	Standard Combination Pole - Type 1	V-SIGN
	TYPE-6	Heavy Duty Davit Pole - Type 6	V-SIGN
	TYPE-7	Heavy Duty Combination Pole - Type 7	V-SIGN
	TYPE-H	Heavy Pole - Type H	V-SIGN
	COMB-H	Heavy Combination Pole - Type H	V-SIGN
	CANTILVR	Cantilever Structure	V-SIGN
	BRIDGE	Sign Bridge Structure	V-SIGN

MoTI Section	1250		TAC Section	Not Applicable
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1250.11 LANE ARROWS

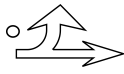
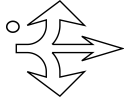


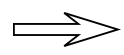
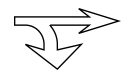
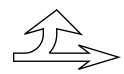
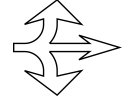



Symbol	Name	Feature	Description	Layer
	HARO	(none)	Straight Through Lane <i>indicates direction of travel</i>	V-ROAD-ARRW C-ROAD-ARRW
	HAROLT	(none)	Left Turn Lane <i>indicates direction of travel</i>	V-ROAD-ARRW C-ROAD-ARRW
	HARORT	(none)	Right Turn Lane <i>indicates direction of travel</i>	V-ROAD-ARRW C-ROAD-ARRW
	HAROSTLT	(none)	Straight Through, Left Turn Lane <i>indicates direction of travel</i>	V-ROAD-ARRW C-ROAD-ARRW
	HAROSTRT	(none)	Straight Through, Right Turn Lane <i>indicates direction of travel</i>	V-ROAD-ARRW C-ROAD-ARRW
	ARO	(none)	Straight Through Lane <i>shows pavement marking location and size</i>	V-ROAD-MRKG-ARRW C-ROAD-MRKG-ARRW
	AROLT	(none)	Left Turn Lane <i>shows pavement marking location and size</i>	V-ROAD-MRKG-ARRW C-ROAD-MRKG-ARRW
	ARORT	(none)	Right Turn Lane <i>shows pavement marking location and size</i>	V-ROAD-MRKG-ARRW C-ROAD-MRKG-ARRW
	AROSTLT	(none)	Straight Through, Left Turn Lane <i>shows pavement marking location and size</i>	V-ROAD-MRKG-ARRW C-ROAD-MRKG-ARRW
	AROSTRT	(none)	Straight Through, Right Turn Lane <i>shows pavement marking location and size</i>	V-ROAD-MRKG-ARRW C-ROAD-MRKG-ARRW

1250.12 MISCELLANEOUS ARROWS





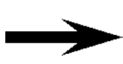






Symbol	Name	Feature	Description	Layer
	DR-ARROW	(none)	Water Flow Direction Arrow	V-DRAN C-DRAN
See 1250.19	NORTH	(none)	North Arrow	G-ANNO-NRTH

MoTI Section	1250		TAC Section	Not Applicable
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1250.13 ROUNDABOUT LANE ARROWS

Symbol	Name	Feature	Description	Layer
	HRA-TLI	(none)	Straight Through and Left Turn, Inside Lane <i>indicates direction of travel</i>	V-ROAD-ARRW C-ROAD-ARRW
	HRA-TRLI	(none)	Straight Through, Right and Left Turn, Inside Lane <i>indicates direction of travel</i>	V-ROAD-ARRW C-ROAD-ARRW
	HRA-LI	(none)	Left Turn, Inside Lane <i>indicates direction of travel</i>	V-ROAD-ARRW C-ROAD-ARRW
	HRA-RLI	(none)	Right and Left Turn, Inside Lane <i>indicates direction of travel</i>	V-ROAD-ARRW C-ROAD-ARRW
	HRA-T	(none)	Straight Through Lane <i>indicates direction of travel</i>	V-ROAD-ARRW C-ROAD-ARRW
	HRA-TR	(none)	Straight Through and Right Turn Lane <i>indicates direction of travel</i>	V-ROAD-ARRW C-ROAD-ARRW
	HRA-TL	(none)	Straight Through and Left Turn Lane <i>indicates direction of travel</i>	V-ROAD-ARRW C-ROAD-ARRW
	HRA-TRL	(none)	Straight Through, Right and Left Turn Lane <i>indicates direction of travel</i>	V-ROAD-ARRW C-ROAD-ARRW
	HRA-RL	(none)	Right and Left Turn Lane <i>indicates direction of travel</i>	V-ROAD-ARRW C-ROAD-ARRW
	HRA-R	(none)	Right Turn Lane <i>indicates direction of travel</i>	V-ROAD-ARRW C-ROAD-ARRW
	HRA-ONLY	(none)	Lane "ONLY" Marking <i>indicates direction of travel</i>	V-ROAD-ARRW C-ROAD-ARRW

MoTI Section	1250		TAC Section	Not Applicable
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Symbol	Name	Feature	Description	Layer
	RA-TLI	(none)	Straight Through and Left Turn, Inside Lane <i>shows pavement marking location and size</i>	V-ROAD-MRKG-ARRW C-ROAD-MRKG-ARRW
	RA-TRLI	(none)	Straight Through, Right/Left Turn, Inside Lane <i>shows marking location and size</i>	V-ROAD-MRKG-ARRW C-ROAD-MRKG-ARRW
	RA-LI	(none)	Left Turn, Inside Lane <i>shows pavement marking location and size</i>	V-ROAD-MRKG-ARRW C-ROAD-MRKG-ARRW
	RA-RLI	(none)	Right and Left Turn, Inside Lane <i>shows pavement marking location and size</i>	V-ROAD-MRKG-ARRW C-ROAD-MRKG-ARRW
	RA-T	(none)	Straight Through Lane <i>shows pavement marking location and size</i>	V-ROAD-MRKG-ARRW C-ROAD-MRKG-ARRW
	RA-TR	(none)	Straight Through and Right Turn Lane <i>shows pavement marking location and size</i>	V-ROAD-MRKG-ARRW C-ROAD-MRKG-ARRW
	RA-TL	(none)	Straight Through and Left Turn Lane <i>shows pavement marking location and size</i>	V-ROAD-MRKG-ARRW C-ROAD-MRKG-ARRW
	RA-TRL	(none)	Straight Through, Right and Left Turn Lane <i>shows pavement marking location and size</i>	V-ROAD-MRKG-ARRW C-ROAD-MRKG-ARRW
	RA-RL	(none)	Right and Left Turn Lane <i>shows pavement marking location and size</i>	V-ROAD-MRKG-ARRW C-ROAD-MRKG-ARRW
	RA-R	(none)	Right Turn Lane <i>shows pavement marking location and size</i>	V-ROAD-MRKG-ARRW C-ROAD-MRKG-ARRW
	RA-ONLY	(none)	Lane "ONLY" Marking <i>shows pavement marking location and size</i>	V-ROAD-MRKG-ARRW C-ROAD-MRKG-ARRW

MoTI Section	1250		TAC Section	Not Applicable
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1250.14 CONSTRUCTION NOTES

Symbol	Name	Feature	Description	Layer
ABANDON	ABANDON	n/a	Abandon	G-ANNO-NOTE
ADJUST	ADJUST	n/a	Adjust	G-ANNO-NOTE
BREAK & ENTER EXISTING	BRK-ENTER	n/a	Break and Enter Existing	G-ANNO-NOTE
FENCE TYPE 'B'	FENC-TYP	n/a	Fence Type 'B'	G-ANNO-NOTE
BEGIN FENCE	BEG-FENC	n/a	Begin Fence	G-ANNO-NOTE
END FENCE	END-FENC	n/a	End Fence	G-ANNO-NOTE
SANDBAG INLET	SANDBAG	n/a	Sandbag Inlet	G-ANNO-NOTE
SWALE	SWALE	n/a	Swale	G-ANNO-NOTE
REMOVE	REMOVE	n/a	Remove	G-ANNO-NOTE

MoTI Section	1250		TAC Section	Not Applicable
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1250.15 MISCELLANEOUS NOTES

Block name	AREA
Description	Right Of Way Area Note
Layer	G-ANNO-NOTE

R/W AREA VALUES

These values denote the right-of-way area within the sheet join lines.

Areas from adjoining sheets are included if (TOTAL) is specified.

Block name	PROFNOTE
Description	Profile Note with Superelevation (attribute)
Layer	G-ANNO-NOTE

NOTE:

1. Elevations shown are Finished Grade
2. Embankment figures shown represent Compacted Quantities
3. Maximum project Superelevation is 6%

Block name	PROFNOT1
Description	Profile Note
Layer	G-ANNO-NOTE

NOTE:

1. Elevations shown are Finished Grade
2. Embankment figures shown represent Compacted Quantities

MoTI Section	1250		TAC Section	Not Applicable
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Block name	HAULNOTE
Description	Volume Overhaul Note
Layer	G-ANNO-NOTE

NOTE:

THIS VOLUME OVERHAUL DIAGRAM IS A PLOT ON WHICH SHRINKAGE AND SWELL ADJUSTMENT FACTORS HAVE BEEN APPLIED TO THE EXCAVATION QUANTITIES. THE VERTICAL SCALE SHOULD THEREFORE NOT BE USED TO SCALE IN SITU EXCAVATION QUANTITIES TO BE OVERHAULED. THE HAUL FIGURES SHOWN REPRESENT THE ACTUAL ESTIMATED UNADJUSTED EXCAVATION QUANTITIES.

Block name	DESSPEED
Description	Design Speed (with attributes)
Layer	G-ANNO-NOTE

DESIGN SPEED 50 km/h	TO STA 100+00
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Block name	DES-RW
Description	Right Of Way Acquisition - Engineer of Record Signature
Layer	G-ANNO-NOTE

FOR R/W ACQUISITION ONLY

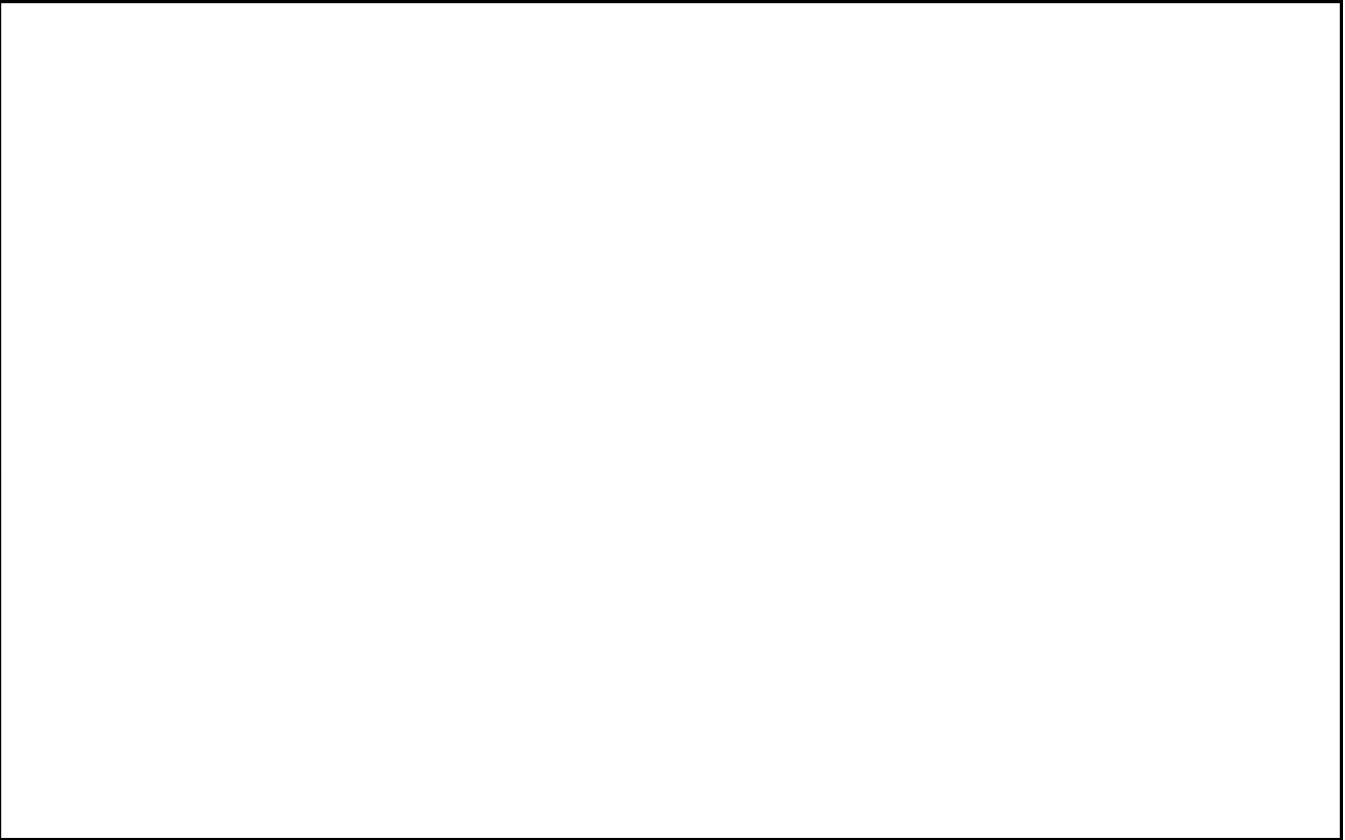
ENGINEER OF RECORD

DATE _____

MoTI Section	1250		TAC Section	Not Applicable
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1250.16 GEOTECH LEGENDS


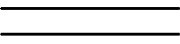

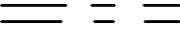




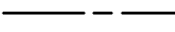
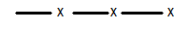

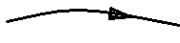

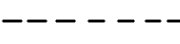
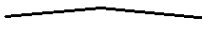

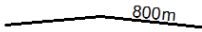
Block name	KEYMAP
Description	Key Map (with attributes)
Layer	B-ANNO-LEGN

			
KEY MAP			
NTS Map Number :	Hwy 1JV	Scale :	1:2,000,000

MoTI Section	1250		TAC Section	Not Applicable
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Block name	LEG-PIT
Description	Pit Development Legend
Layer	B-ANNO-LEGN

LEGEND

	NATURAL EMBANKMENT		MAINTAINED ROAD
	PIT FACE/STOCKPILE		ACCESS ROAD
	TEST HOLE		TREE LINE
	TEST PIT		SWAMP
	DISTRICT LOT LINE		FENCE
	MONUMENT		CREEK
	IRON PIN		TRAIL
	20M CONTOUR		BUILDING LOCATION
	100M CONTOUR		

MoTI Section	1250		TAC Section	Not Applicable
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Block name	LEG-SOIL
Description	Soil Classification Legend
Layer	B-ANNO-LEGN

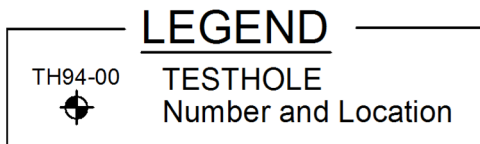
MATERIALS CLASSIFICATION LEGEND

MAJOR DIVISIONS		SYMBOL	SOIL TYPE
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	GW	WELL GRADED GRAVELS OR GRAVEL-SAND MIXTURES, < 5% FINES
		GP	POORLY-GRADED GRAVELS OR GRAVEL-SAND MIXTURES, < 5% FINES
		GM*	SILTY GRAVELS GRAVEL-SAND-SILT MIXTURES
		GC*	CLAYEY GRAVELS GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS	SW	WELL-GRADED SANDS OR GRAVELLY SANDS, < 5% FINES
		SP	POORLY-GRADED SANDS OR GRAVELLY SANDS, < 5% FINES
		SM*	SILTY SANDS SAND-SILT MIXTURES
		SC*	CLAYEY SANDS SAND-CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS w_L <50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
		OL	ORGANIC SILTS AND ORGANIC SILT-CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS w_L >50	MH	INORGANIC SILTS, MICACEOUS OR DIATOM-ACEOUS FINE SANDY OR SILTY SOILS, PLASTIC SILTS
		CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
		OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
ORGANIC	Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS	
TOPSOIL	TS	TOPSOIL WITH ROOTS, ETC.	
COBBLES	SB	ROCK FRAGMENTS AND COBBLES, PARTICLE SIZE 75mm TO 300mm	
BOULDERS	LB	LARGE BOULDERS, PARTICLE SIZE OVER 300mm	
BEDROCK	BR	BEDROCK	
USE DUAL SYMBOL FOR SOILS HAVING 5 - 12% PASSING .075 SIEVE			
<div>*GM1; GC1; SM1; SC1; 12 - 20% GM2; GC2; SM2; SC2; 20 - 30% GM3; GC3; SM3; SC3; 30 - 40% GM4; GC4; SM4; SC4; 40 - 50%</div> <div>} PASSING .075mm SIEVE</div>			

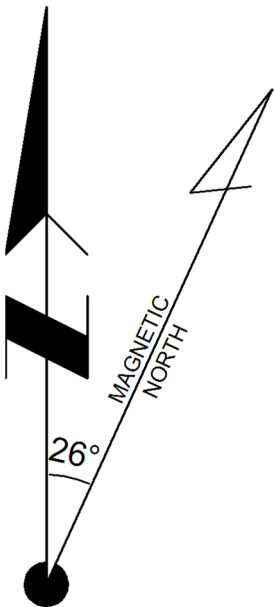
REV. 90-04-26

MoTI Section	1250		TAC Section	Not Applicable
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Block name	LEG-TH
Description	Testhole Legend
Layer	B-ANNO-LEGN



Block name	MAGNORTH
Description	Magnetic North (with declination attribute)
Layer	B-ANNO-LEGN

















1250.17 GEOTECH GENERAL






Symbol	Name	Feature	Description	Layer
FC X	FEATURE	n/a	Feature Code (attribute)	B-BORE-SYMB-FEAT
HUB 	HUB	n/a	Hub (attribute)	B-BORE-SYMB-HUBA

MoTI Section	1250		TAC Section	Not Applicable
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1250.18 GEOTECH PIT DEVELOPMENT

Symbol	Name	Feature	Description	Layer
	CRUSHER	n/a	Crusher Setup	B-BORE-SYMB
	EXCAVATE	n/a	Excavation	B-BORE-SYMB
	PROCESS	n/a	Process	B-BORE-SYMB
	DEVDIR	n/a	Development Direction	B-BORE-SYMB
	DEVEXT	n/a	Future Development Direction	B-BORE-SYMB
	SLOPE	GSI	Geotechnical Slope Indicator	B-BORE-SYMB-TEST
	ST	n/a	Stockpile	B-BORE-SYMB
	STCRUSH	n/a	Stockpile Crush	B-BORE-SYMB
	STOVERBU	n/a	Stockpile Overburden	B-BORE-SYMB
	STOVSIZ	n/a	Stockpile Oversize	B-BORE-SYMB
	STTOPSO	n/a	Stockpile Topsoil	B-BORE-SYMB
	STWASTE	n/a	Stockpile Waste	B-BORE-SYMB
	STREJECT	n/a	Stockpile Reject	B-BORE-SYMB
	STUNACEP	n/a	Stockpile Unacceptable	B-BORE-SYMB

MoTI Section	1250		TAC Section	Not Applicable
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Symbol	Name	Feature	Description	Layer
THyy-nn 	TESTHOLA	n/a	Testhole with # (attribute)	B-BORE-SYMB-HOLE
TPyy-nn 	TESTPITA	n/a	Testpit with # (attribute)	B-BORE-SYMB-TPIT
PZ 00-00 	PIEZMTR	PZ	Piezometer (attribute)	B-BORE-SYMB-TEST
SP 00-00 	SPLATE	SP	Settlement Plate (Pipe) (attribute)	B-BORE-SYMB-TEST
 OW	OWELL	OW	Well - Observation Well	B-BORE-SYMB-TEST

MoTI Section	1250		TAC Section	Not Applicable
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1250.19 TITLEBLOCKS AND FRAMES

Use all of these blocks at ½ scale for 11x17 plots.

Block name	FRAME
Description	POLYLINE border with two POINTs defining the lower-left and upper-right extents of a standard D-size sheet. The blank area on the left is for binding.
Layer	G-ANNO-TTLB




Block name	FOLDMKS and FOLDMKSI
Description	Adds tick marks to the FRAME block to show fold locations when folding 11x17 plots to fit in a standard letter size document/binder. Use the same insertion point as the FRAME block. FOLDMKS places the ticks on the outside of the frame, FOLDMKSI places the ticks on the inside of the frame.
Layer	G-ANNO-TTLB

Block name	TITLEBLOCKS
Description	Adds standard titleblocks (dynamic block with attributes) to FRAME (use the same insertion point as the FRAME block)
Dynamic Properties	<p>Select from seven titleblock configurations</p> <ol style="list-style-type: none"> 1. Standard 2. Standard Stacked 3. Standard Stacked (Consultant Logo Box) 4. Low Profile (Horizontal) 5. Low Profile (Vertical) 6. Small Key Plan 7. Large Key Plan
Layer	G-ANNO-TTLB




Block name	SCALES
Description	Adds drawing scales to TITLEBLOCKS (dynamic block) (insert to a polyline vertex, to left of SCALE label in TITLEBLOCKS)
Dynamic Properties	<p>Select from sixteen different scales</p> <ul style="list-style-type: none"> • 1:50 • ... • 1:50,000 • 1:100 Horizontal 1:50 Vertical • ... • 1:2000 Horizontal 1:200 Vertical <p>Select horizontal or vertical orientation. Vertical is used for the Low Profile (Vertical) titleblock configuration.</p>
Layer	G-ANNO-TTLB

MoTI Section	1250		TAC Section	Not Applicable
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Standard Stacked Titleblock (with Consultant Logo box)

		BRITISH COLUMBIA		MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE REGION_NAME BRANCH			
SCALE 				CAD FILENAME _____ DATE _____ YYYY-MM-DD			
REV	DATE	REVISIONS				SIGNATURE	
ENGINEER OF RECORD _____ DATE _____ YYYY-MM-DD				DESIGNED _____ DESIGNED BY _____ DATE _____ YYYY-MM-DD QUALITY CONTROL _____ QC BY _____ DATE _____ YYYY-MM-DD QUALITY ASSURANCE _____ QA BY _____ DATE _____ YYYY-MM-DD DRAWN _____ DRAWN BY _____ DATE _____ YYYY-MM-DD			
FILE NUMBER		PROJECT NUMBER		REG	DRAWING NUMBER		REV
FILE NUMBER		PROJECT NUMBER		R	DWG NUMBER		A

Low Profile Titleblock (Horizontal Version)

SCALE 		CAD FILENAME _____ DATE _____ YYYY-MM-DD				BRITISH COLUMBIA		MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE REGION_NAME BRANCH			
REV	DATE	REVISIONS		SIGNATURE							
ENGINEER OF RECORD _____ DATE _____ YYYY-MM-DD				DESIGNED _____ DESIGNED BY _____ DATE _____ YYYY-MM-DD QUALITY CONTROL _____ QC BY _____ DATE _____ YYYY-MM-DD QUALITY ASSURANCE _____ QA BY _____ DATE _____ YYYY-MM-DD DRAWN _____ DRAWN BY _____ DATE _____ YYYY-MM-DD							
FILE NUMBER		PROJECT NUMBER		REG	DRAWING NUMBER		REV				
FILE NUMBER		PROJECT NUMBER		R	DWG NUMBER		A				

Large Key Plan

		BRITISH COLUMBIA		MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE REGION_NAME BRANCH			
DIRECTOR, ENGINEERING _____ DATE _____ YYYY-MM-DD				EXECUTIVE DIRECTOR, _____ REGION _____ DATE _____ YYYY-MM-DD			
FILE NUMBER		PROJECT NUMBER		REG	DRAWING NUMBER		REV
FILE NUMBER		PROJECT NUMBER		R	DWG NUMBER		A

Small Key Plan

The signature area from the large key plan is moved to the lower center of the drawing frame and the drawing number and revision box remain at the lower right.

DIRECTOR, ENGINEERING _____ DATE _____ YYYY-MM-DD		EXECUTIVE DIRECTOR, _____ REGION _____ DATE _____ YYYY-MM-DD	
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DRAWING NUMBER	REV
DWG NUMBER	A

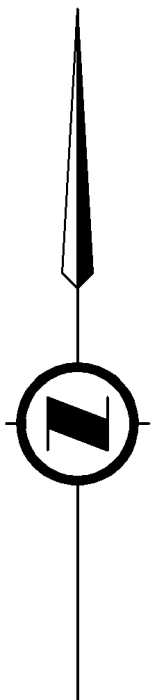
MoTI Section	1250		TAC Section	Not Applicable
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Block name	FRONTPG and FRONTPG_COLOR
Description	Includes the large MOTLOGO or MOTLOGO_COLOR blocks plus title page titles. Requires FRAME block.
Layer	G-ANNO-TTLB

Block name	MOTLOGO and MOTLOGO_COLOR
Description	Large BC logo in black/grey or colour. Ministry title included.
Layer	G-ANNO-TTLB

See [Figure 1220.A](#) for an example title page.

Block name	NORTH
Description	North Arrow
Layer	G-ANNO-NRTH



MoTI Section	1260	TAC Section	Not Applicable
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1260 AUTOCAD LINETYPES

1260.01 LINETYPE STANDARDS

The BC MoT Engineering Branch has developed standards for representing existing features and proposed design features that are to be shown on contract drawings.

The linetypes are defined in a standard AutoCAD LIN file (**BC MoT.lin**) and supported by a shape file (**BC MoT.shx**). These and other supplied files are available for consultant download as described in [Section 1240](#).

Shapes and Text in Linetypes

Many of the linetypes include custom shapes or text labels. All shapes are provided by the **BC MoT.shx** compiled shape file which must be present in the AutoCAD search path. All text labels use the **Standard** text style which should exist and be assigned the **RomanS.shx** font in all drawings.

A number of linetypes which use text labels were previously also the longest patterns. Most required polylines to be over 70m in length before the pattern would appear. All of these linetype patterns have been reduced by half so that the text label appears more frequently and so that the pattern will display for shorter polylines.

Linetype Names

Linetype names have changed a number of times since the original CLINE linetypes were created in the 1980's. For example, the linetype for rural white paint line (broken white line) has been BL, BC_EAD_RP and EAD_BWL and is now ALGN-BWL (Alignment – Broken White Line).

As the linetypes are pre-loaded into the standard drawing template and assigned to the default layers, the change in names should not be an issue.

Obsolete Linetypes

Previous standards included a large number of “continuous” linetypes with unique names. These names were used to identify non-patterned polylines within a more limited layer system.

Most “proposed” linetypes have also been eliminated. These patterns were very similar to their

“existing” counterparts with the primary difference being the colour. For example, UG-TEL (underground telephone) is now used for both the C-COMM-UGND and V-COMM-UGND layers.

Layer Linetype Assignment

All linetypes are pre-loaded into the latest BC MoT drawing template and assigned to various layers.

All entities are to be assigned a ByLayer linetype as per [Section 1240](#). One exception is the BAR-MB-L, BAR-MB-R, BAR-RB-L and BAR-RB-R alternate barrier linetypes. These may be assigned individually when the polyline represents the inner or outer edge of the barrier as opposed to the centre of the barrier.

Linetype Samples

Samples have been grouped into categories in the following subsections. These images have been taken from the **linetypes and hatch patterns** sample drawing file provided by the ministry.

[Alignment and Barrier](#) [1260.02](#)

[Construction and Existing Features](#) [1260.03](#)

[Underground and Geotech](#) [1260.04](#)

[Hydrology, Lot Boundary and Toe](#) [1260.05](#)

[Topography And Wall](#) [1260.06](#)

Each linetype in the following sections includes a description, linetype name, a list of feature codes which use the linetype and a list of layers which are assigned the linetype.

Contour Intervals

Contour standards are shown in [Section 1260.07](#). The diagram describes the normal line weight for minor and major contours and the normal text height for contour information. Also shown are the contour intervals for various scales. Refer to [Section 1240.04](#) for contour label text style information.

Linetype Dimensions

[Section 1260.08](#) contains a table which describes the dimensions of each linetype in detail.

MoTI Section	1260	TAC Section	Not Applicable
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1260.02 ALIGNMENT AND BARRIER LINETYPES

Linetype Labels	Description, Name, Feature Codes, AutoCAD Layers
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ALIGNMENT

Broken White Line	ALGN-BWL	BL	C-ROAD-MRKG-BRKN, V-ROAD-MRKG-BRKN
Broken White Line - Bus Bay/Pullout	ALGN-BWL-PUL		C-ROAD-MRKG-BUSB
Broken White Line - Reserved Lane	ALGN-BWL-RES		C-ROAD-MRKG-RSLN
Broken White Line - Roundabout Circulating Lane	ALGN-BWL-CIRC		C-ROAD-MRKG-RCLN
Broken White Line - Roundabout Yield Line	ALGN-BWL-YIELD		C-ROAD-MRKG-RYLN
Broken White Line - Urban	ALGN-BWL-URB	UPL	C-ROAD-MRKG-UPLN, V-ROAD-MRKG-URPL
Centreline	ALGN-CNTR	C, CL, PCL	C-ROAD-CNTR, V-ROAD-CNTR, V-ROAD-CNTR-LLIN
Deceleration or Acceleration Lane	ALGN-DECL	DECL	C-ROAD-MRKG-DECL, V-ROAD-MRKG-DECL
Double Yellow Line	ALGN-DYL	DL	V-ROAD-MRKG-YELD
Intersection Guiding Line	ALGN-IGL		C-ROAD-MRKG-IGLN
Path Tracker Linetype	ALGN-PATH		C-ROAD-TURN-FFEN
Shoulder	ALGN-SHLD	LS, RS, SH, SHLD	C-ROAD-SHLD, V-ROAD-GRVL-SHLD, V-ROAD-SHLD
Yellow Line	ALGN-YL	YL	V-ROAD-MRKG-YELO

BARRIERS

Cable Barrier with Posts	BAR-CABLE		C-ROAD-BARM-CABL, C-ROAD-BARR-CABL, V-ROAD-BARM-CABL
Guard Rail with Posts	BAR-GUARD	GS, PGS	C-ROAD-BARR-GRAL, V-ROAD-BARR-GRAL
Concrete Median Barrier - 2.5m	BAR-MB	MBR, PCMB	C-ROAD-BARM-CONC, V-ROAD-BARM-CONC
Concrete Median Barrier - 2.5m (inside left)	BAR-MB-L	MBR, PCMB	C-ROAD-BARM-CONC, V-ROAD-BARM-CONC
Concrete Median Barrier - 2.5m (inside right)	BAR-MB-R	MBR, PCMB	C-ROAD-BARM-CONC, V-ROAD-BARM-CONC
Concrete Roadside Barrier - 2.5m	BAR-RB	RB, PCRB	C-ROAD-BARR-CONC, V-ROAD-BARR-CONC
Concrete Roadside Barrier - 2.5m (inside left)	BAR-RB-L	RB, PCRB	C-ROAD-BARR-CONC, V-ROAD-BARR-CONC
Concrete Roadside Barrier - 2.5m (inside right)	BAR-RB-R	RB, PCRB	C-ROAD-BARR-CONC, V-ROAD-BARR-CONC

MoTI Section	1260	TAC Section	Not Applicable
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1260.03 CONSTRUCTION AND EXISTING FEATURES LINETYPES

Linetype Labels	Description, Name, Feature Codes, AutoCAD Layers
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CONSTRUCTION

Berm in Cut or Fill	CONST-BERM	BE,PBE	C-ROAD-TOES-BERM,V-TOPO-BERM
Clearing and Grubbing	CONST-CLGR	GC,PGC	C-RWAY-CLGR-BNDY,V-SITE-VEGE-CLGR
Hog Fuel	CONST-HOGF	HF,PHF	C-SECT-TOPO-HOGF,C-TOPO-BNDY-HOGF,V-SITE-HOGF
Riprap	CONST-RRAP	RI,PRI	C-DRAN-RRAP,V-DRAN-RRAP
Stripping	CONST-STRIP	S,STRPLIM,STRIPNG	C-SECT-STRP
Waste	CONST-WASTE	WE	V-TOPO-WAST

EXISTING FEATURES

Dirt Road	EXST-DIRTRD	DR	V-ROAD-DIRT
Fence	EXST-FENCE	FE,PFE	C-SITE-FENC,V-SITE-FENC
Gravel - Gr. Driveway, Edge of Gr., Gr. Road	EXST-GRAVEL	GL,GD,EG,GR	V-ROAD-GRVL,V-SITE-GRVL
Railway	EXST-RAIL	RR	V-RAIL
Railway Ballast	EXST-RAILBALLAST	BA	V-RAIL-GRVL
Rest Area	EXST-RESTAREA	RA	V-ROAD-REST
Road	EXST-ROAD	RD	V-ROAD-ROAD
Toe (Existing)	EXST-TOE	LT,RT,TO	V-ROAD-TOES
Hedge Line, Bush Line, Tree Line	EXST-TREELINE	BH,HG,TL	V-SITE-VEGE-BUSH,V-SITE-VEGE-TROW
Garden, Lawn, Vegetation	EXST-VEG	GN,L,VN	V-SITE-VEGE,V-SITE-VEGE-TURF

MoTI Section	1260	TAC Section	Not Applicable
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1260.04 UNDERGROUND AND GEOTECH LINETYPES

Linetype Labels	Description, Name, CAICE Feature Codes, AutoCAD Layers
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UNDERGROUND

Storm / Sewer Drain —S—	UG-DRAIN	DS,PDS	S	S	C-STRM-UGND,V-STRM-UGND
Underground Electrical Power —UE—	UG-ELEC UE	UE,PUE	UE	UE	C-POWR-UGND,V-POWR-UGND
Gas Main —G—	UG-GAS	GM,PGM	G	G	C-NGAS-UGND,V-NGAS-UGND
Underground Miscellaneous —UG—	UG-MISC UG	UG,PUG	UG	UG	C-UTIL-UGND,V-UTIL-UGND
Oil Line —OIL—	UG-OIL OIL	OL,POL	OIL	OIL	C-OIL-UGND,V-OIL-UGND
Pipeline (Not Plastic)	UG-PIPE	CS,CT,PN,CUL			V-DRAN-PIPE
Pipeline (Plastic)	UG-PLASTIC	PC			V-DRAN-PIPE-PLST
Sanitary Sewer Line —SAN—	UG-SAN SAN	SU,PSU	SAN	SAN	C-SSWR-UGND,V-SSWR-UGND
Underground Telephone —UT—	UG-TEL UT	UT,PUT	UT	UT	C-COMM-UGND,V-COMM-UGND
Water Main —W—	UG-WATER W	WR,PWR	W	W	C-WATR-UGND,V-WATR-UGND

GEOTECH

Type A - Solid Rock	GEO-TYPE-A	TYPE-A,TYPE-A1,TYPE-A2,TYPE-A3			C-SECT-TYPEA
Water Table Elevation (Estimated)	GEO-WTE ▽	EWT	▽		B-BORE-ESWT
Water Table Elevation (Measured)	GEO-WTM ▼	MWT	▼		B-BORE-MSWT

MoTI Section	1260	TAC Section	Not Applicable
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1260.05 HYDROLOGY, LOT BOUNDARY AND TOE LINETYPES

Linetype Labels	Description, Name, Feature Codes, AutoCAD Layers
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HYDROLOGY

Ditch, Creek or Stream Center	HYD-CNTR	CK,DC,SM,PDC	CV-DRAN-DTCH-CNTR,V-TOPO-WATR-CNTR,V-TOPO-WATR-STRE
Ditch, Creek or Stream Center (Reverse)	HYD-CNTR-R	PDC	CV-DRAN-DTCH-CNTR,V-TOPO-WATR-CNTR,V-TOPO-WATR-STRE
Ditch Edge	HYD-DITCH	DE	V-DRAN-DTCH-EDGE
Edge of Water	HYD-EW	EW	V-TOPO-WATR-EDGE
High Water Mark	HYD-HW	HW	V-TOPO-WATR-HIGH
High Water Mark (Extreme)	HYD-HWE	EH	V-TOPO-WATR-EHWM
Seepage	HYD-SEEP	SG	V-TOPO-WATR-SEEP

LOT BOUNDARIES

Easement	LOT-EA	EA,PTLCA	C-RWAY-TLCA,V-PROP-ESMT
Gazette Boundary	LOT-GB	GB	V-PROP-GAZT
International Boundary	LOT-IB	IB	V-PROP-BNDY-INTL
Quarter Section Line	LOT-QS	QS	V-PROP-QTRS
Right of Way	LOT-RW	PRW	C-RWAY-BNDY
Section Line / District Lot Boundary	LOT-SL	SL	V-PROP-SECT

TOES

Base of Bridge End Fill	TOES-BBEF	PBBEFILL	C-ROAD-TOES-BBEF
Shoulder Excavation Start	TOES-SHEX	PSHXL,PSHXR	C-ROAD-TOES-SHEX
Toe (Design)	TOES-TOE	PTO,PTC,PTF,SURFLIM,BNKS,CUT,STKCUT,FILL,STKFIL	C-ROAD-TOES,C-ROAD-TOES-SURF

MoTI Section	1260	TAC Section	Not Applicable
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1260.06 TOPOGRAPHY AND WALL LINETYPES

Linetype Labels	Description, Name, Feature Codes, AutoCAD Layers
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TOPOGRAPHY

Base of Slope or Embankment	TOPO-BSLP	BS	V-TOPO-BOTB
Ground or Pavement Crack	TOPO-CRACK	GK,PK	V-ROAD-PVMT-CRCK,V-TOPO-CRCK
Type A Horizon	TOPO-HORIZON-A	A	V-TOPO-ROCK-HRZA
Marsh / Swamp	TOPO-MARSH	MS	V-TOPO-WETL
Solid Rock or Top of Rock	TOPO-ROCK	SR,TR	V-TOPO-ROCK-SOLD,V-TOPO-ROCK-TRCK
Sand	TOPO-SAND	SA	V-TOPO-SAND
Slide, Scarp, Sluff Line	TOPO-SLIDE	SF	V-TOPO-SLGH
Talus, Broken or Loose Rock or Base of Rock	TOPO-TALUS	BN,BR,LR,T	V-TOPO-ROCK-BRCK,V-TOPO-ROCK-LOOS,V-TOPO-TALS
Trail - Mapping Requirement	TOPO-TRAIL	TI	V-TOPO-TRAL
Top of Slope or Embankment	TOPO-TSLP	TB	V-TOPO-TOPB

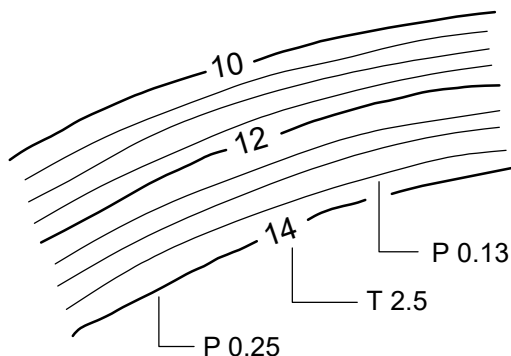
WALLS

Wall (Design)	WALL-DESIGN	PBI,PHD,PRE,PWW	C-STRC-WALL-BINW,...WALL-HEAD,...WALL-RETN,...WALL-WING
Wall (Existing)	WALL-EXIST	BI,HD,RE,WW	V-STRC-WALL-BINW,...WALL-HEAD,...WALL-RETN,...WALL-WING

1260.07 CONTOUR INTERVALS**SITE PLAN**

1 : 250

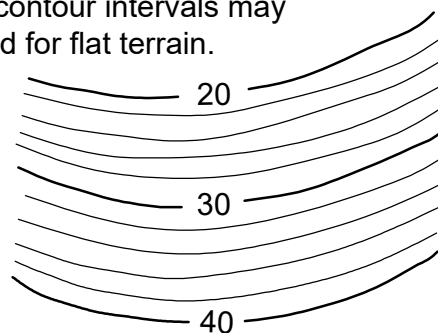
Use 0.5 m contour intervals.

**PLAN**

1 : 500

Use 2 m contour intervals, accentuate 10 m contours.

0.5 m contour intervals may be used for flat terrain.



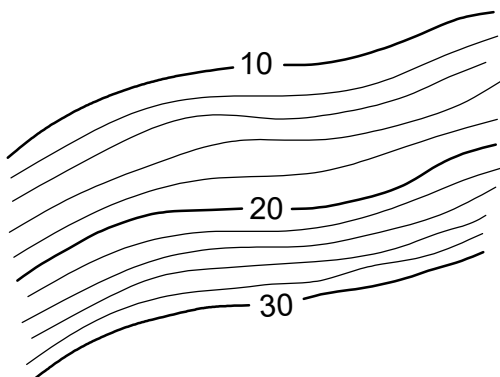
T = Text height in mm
P = Pen width in mm

Depending on the type of plotter, users may have to adjust pen colours to produce a legible screened contour plot that does not obscure the other drawing entities.

PLAN

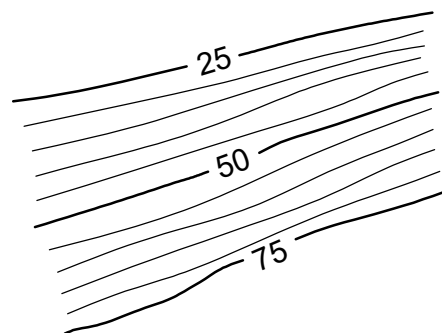
1 : 1000

Use 2 m contour intervals, accentuate 10 m contours.

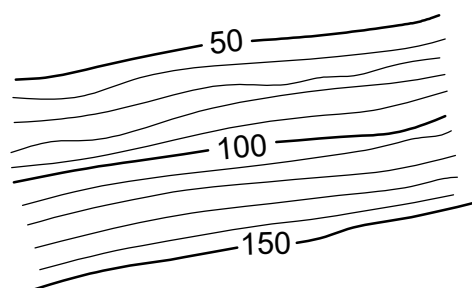
**MAPPING RECCE TYPE**

1 : 5000

For 5 m contour intervals, accentuate 25 m contours.



For 10 m contour intervals, accentuate 50 m contours.

**KEY PLANS:** Variable Scales

Use 2 m, 5 m, or 10 m contours.

MoTI Section	1260	TAC Section	Not Applicable
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1260.08 LINETYPE PATTERN DIMENSIONS

General

This section details the dimensions of the repeating patterns that make up the supplied linetypes. Each pattern is made up of one or more line segments (dashes) or points (dots) separated by empty space (gaps). Some linetypes include shapes or text as part of the repeating pattern.

The length of the pattern is determined by the lengths of the dashes and gaps. Shapes, text and dots do not contribute to the length. A pattern must start with either a dot or a dash.

Repeating the Pattern

AutoCAD repeats the pattern as many times as possible over the length of the polyline but will offset the pattern to ensure that the polyline always ends with a dot or a dash. As a result, the lengths of the line segments at the ends will usually be slightly longer or shorter than the pattern dimensions would indicate.

If a dot is used to start a linetype, AutoCAD will place a dot and a gap of varying length at the two ends of the polyline. The railway linetype starts with a dot and uses shapes (and gaps that are the length of the shapes) to simulate the appearance of parallel lines with solid filled areas. This pattern contains no dashes.

Patterning Around Vertices

Older versions of AutoCAD would restart the pattern at each vertex of a polyline. This would lead to a very uneven appearance with no pattern showing when the vertices were closer than the pattern length. Newer versions of AutoCAD allow linetype generation to be turned on. This setting should be turned on for each polyline that uses a linetype and will enable the pattern to proceed through the vertices.

Lettering or symbols near vertices may show artifacts as they are not able to change direction once started. Complex patterns such as the railway, barrier, hedge and wall linetypes are made up mostly of symbols and will therefore show noticeable errors if there are significant bends or a large number of vertices in the polyline.

Longer Patterns

A pattern that has very long dashes may be defined in a number of ways, for example:

- 30m dash, 2m gap, 6m dash, 2m gap
- 5m dash, 2m gap, 6m dash, 2m gap, 25m dash (effective dash length of 5m + 25m = 30m)

Both definitions result in 30m dashes as the pattern repeats. The second definition results in the 2m gaps moving much closer to the start of the line more clearly identifying the polyline as something other than a standard Continuous linetype.

Name, Description	Pattern Dimensions (metres) (l x w)
Alignment	
ALGN-BWL, Broken White Line	dash 5, gap 8
ALGN-BWL-CIRC, BWL - Roundabout Circulating Lane	dash 1, gap 1 (polyline width 0.2m)
ALGN-BWL-PUL, BWL - Bus Bay/Pullout	dash 1, gap 1
ALGN-BWL-RES, BWL - Reserved Lane	dash 6, gap 3
ALGN-BWL-URB, BWL - Urban	dash 3, gap 6
ALGN-BWL-YIELD, BWL - Roundabout Yield Line	dash 0.6, gap 0.6 (polyline width 0.4m)
ALGN-CNTR, Centreline	dash 5, gap 2, dash 6, gap 2, dash 25 (effective dash 30m)

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Name, Description	Pattern Dimensions (metres) (l x w)
Alignment (continued)	
ALGN-DECL, Deceleration or Acceleration Lane	dash 3, gap 3
ALGN-DYL, Double Yellow Line	dash 5, gap 2, dash 6, gap 2, dash 25 (effective dash 30m)
ALGN-IGL, Intersection Guiding Line	dash 0.5, gap 0.5
ALGN-PATH, Path Tracker Linetype	dash 1, gap 1
ALGN-SHLD, Shoulder	dash 3, gap 2
ALGN-YL, Yellow Line	dash 5, gap 2, dash 6, gap 2, dash 25 (effective dash 30m)
Barriers	
BAR-CABLE, Cable Barrier with Posts	dash 5, sym, dash 10 (15m between symbols, 2m x 1.5m)
BAR-GUARD, Guard Rail with Posts	dash 5, sym, dash 10 (15m between symbols, 1.5m x 0.75m)
BAR-MB, Concrete Median Barrier - 2.5m	dot, five sub-symbols, gap 2.5 (2.5m x 0.6m barriers)
BAR-MB-L, Concrete Median Barrier - 2.5m (inside left)	same as above, centreline is left side of barrier
BAR-MB-R, Concrete Median Barrier - 2.5m (inside right)	same as above, centreline is right side of barrier
BAR-RB, Concrete Roadside Barrier - 2.5m	same as BAR-MB
BAR-RB-L, Concrete Roadside Barrier - 2.5m (inside left)	same as BAR-MB-L
BAR-RB-R, Concrete Roadside Barrier - 2.5m (inside rt)	same as BAR-MB-R
Construction	
CONST-BERM, Berm in Cut or Fill	dash 7, gap 3
CONST-CLGR, Clearing and Grubbing	dash 5, gap 5, dash 10 (effective dash 15m)
CONST-HOGF, Hog Fuel	dash 6, gap 6
CONST-RRAP, Riprap	dash 4, gap 3
CONST-STRIP, Stripping	dash 7, gap 2
CONST-WASTE, Waste	dash 5, gap 5

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Name, Description	Pattern Dimensions (metres) (l x w)
Existing Features	
EXST-DIRTROAD, Dirt Road	dash 4, gap 2
EXST-FENCE, Fence	dash 5, gap 2.5, "X", dash 15, gap 2, dash 10 (1.8m text is centred in 2.5m gap, two 15m dashes)
EXST-GRAVEL, Gravel - G. Driveway, Edge of G., G. Road	dash 6, gap 2
EXST-RAIL, Railway	dot, ten sub-symbols, gap 10 (5m x 0.5m box, 5m x 0.5m filled)
EXST-RAILBALLAST, Railway Ballast	dash 15, gap 5
EXST-RESTAREA, Rest Area	dash 5, gap 4
EXST-ROAD, Road	dash 6, gap 2
EXST-TOE, Toe (Existing)	dash 6, gap 4
EXST-TREELINE, Hedge Line, Bush Line, Tree Line	dot, symbol, gap 2 (symbols are 2m x 1m, fills gap)
EXST-VEG, Garden, Lawn, Vegetation	dash 0.5, gap 2.5
Underground	
UG-DRAIN, Storm / Sewer Drain	dash 2.5, gap 2.4, "S", dash 15, gap 2, dash 12.5 (1.8m text is centred in 2.4m gap, two 15m dashes)
UG-ELEC, Underground Electrical Power	dash 2.5, gap 6, "UE", dash 15, gap 2, dash 12.5 (1.8m text is centred in 6m gap, two 15m dashes)
UG-GAS, Gas Main	dash 2.5, gap 2.571, "G", dash 15, gap 2, dash 12.5 (1.8m text is centred in 2.571m gap, two 15m dashes)
UG-MISC, Underground Miscellaneous	dash 2.5, gap 6.171, "UG", dash 15, gap 2, dash 12.5 (1.8m text is centred in 6.171m gap, two 15m dashes)
UG-OIL, Oil Line	dash 2.5, gap 7.371, "OIL", dash 15, gap 2, dash 12.5 (1.8m text is centred in 7.371m gap, two 15m dashes)
UG-PIPE, Pipeline (Not Plastic)	dash 5, gap 1
UG-PLASTIC, Pipeline (Plastic)	dash 4, gap 1
UG-SAN, Sanitary Sewer Line	dash 2.5, gap 9.086, "SAN", dash 15, gap 2, dash 12.5 (1.8m text is centred in 9.086m gap, two 15m dashes)
UG-TEL, Underground Telephone	dash 2.5, gap 5.657, "UT", dash 15, gap 2, dash 12.5 (1.8m text is centred in 5.657m gap, two 15m dashes)
UG-WATER, Water Main	dash 2.5, gap 3.429, "W", dash 15, gap 2, dash 12.5 (1.8m text is centred in 3.429m gap, two 15m dashes)

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Name, Description	Pattern Dimensions (metres) (l x w)
Geotech	
GEO-TYPE-A, Type A - Solid Rock	dash 12.7, gap 6.35
GEO-WTE, Water Table Elevation (Estimated)	dash 0.1, gap 2.5, symbol, (four dash 5, gap 2.5), dash 4.9 (symbol 2m x 1.72m centered in 2.5m gap, five 5m dashes)
GEO-WTM, Water Table Elevation (Measured)	same as above with filled in symbol
Hydrology	
HYD-CNTR, Ditch, Creek or Stream Center	dash 5, symbol, gap 10, dash 5 (effective dash 10m) arrow is 5m x 0.8m, uses 5m of the 10m gap, effective gap 5m
HYD-DITCH, Ditch Edge	dash 8, gap 4
HYD-EW, Edge of Water	dash 2.5, gap 7.676, "HWM", dash 15, gap 2, dash 12.5 (1.3m text is centred in 7.676m gap, two 15m dashes)
HYD-HW, High Water Mark	dash 2.5, gap 6.343, "UT", dash 28.5 (1.8m text is centred in 6.343m gap, effective 31m dash)
HYD-HWE, High Water Mark (Extreme)	dash 0.5, gap 4.5
HYD-SEEP, Seepage	dash 0.5, gap 1
Lot Boundaries	
LOT-EA, Easement	dash 5, gap 5, dash 5 (effective dash 10m)
LOT-GB, Gazette Boundary	dash 5, gap 5, dash 10 (effective dash 15m)
LOT-IB, International Boundary	dash 5, gap 5, dash 5, gap 5, dash 5, gap 5, dash 30, gap 5
LOT-QS, Quarter Section Line	dash 5, gap 5, dash 25 (effective dash 30m)
LOT-RW, Right of Way	dash 5, gap 5, dash 30, gap 5, dash 5, gap 5
LOT-SL, Section Line / District Lot Boundary	dash 5, gap 5, dash 5, gap 5, dash 25 (effective dash 30m)
Toes	
TOES-BBEF, Base of Bridge End Fill	dash 2, gap 2
TOES-SHEX, Shoulder Excavation Start	dash 2, gap 2
TOES-TOE, Toe (Design)	dash 2, gap 2

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Name, Description	Pattern Dimensions (metres) (l x w)
Topography	
TOPO-BSLP, Base of Slope or Embankment	dash 1, gap 1
TOPO-CRACK, Ground or Pavement Crack	dash 2, gap 1
TOPO-HORIZON-A, Type A Horizon	dash 4, gap 1, dash 1, gap 1, dash 1, gap 1
TOPO-MARSH, Marsh / Swamp	dash 6, gap 1
TOPO-ROCK, Solid Rock or Top of Rock	dash 4, gap 4
TOPO-SAND, Sand	dash 5, gap 3
TOPO-SLIDE, Slide, Scarp, Sluff Line	dash 16.5, sym, gap 5 (2m x 1.72m symbol centered on dash)
TOPO-TALUS, Talus, Broken or Loose R. or Base of Rock	dash 2, gap 2.75, dash 0.5, gap 2.75
TOPO-TRAIL, Trail - Mapping Requirement	dash 1, gap 1, dash 0.5, gap 1
TOPO-TSLP, Top of Slope or Embankment	dash 5, sym, dash 5, sym (short tick is 1.25m, long tick is 2.5m)
Walls	
WALL-DESIGN, Wall (Design)	dash 4, gap 4 (4m x 0.5m shape fills the gap)
WALL-EXIST, Wall (Existing)	dash 8, gap 4 (4m x 0.5m shape fills the gap)

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