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APPENDIX TC-04

**Traffic Control Provisions
(Contract Document)**

State of Ohio
Department of Transportation
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**Innerbelt Bridge
Construction Contract Group 1 (CCG1)**

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CITY OF CLEVELAND TRAFFIC SIGNAL SUPPORT SPECIFICATIONS

D-64 COMBINATION SIGNAL SUPPORT (BY TYPE AND DESIGN) & SIGNALIZATION MISC.: SIGNAL, OVERHEAD SIGN AND LIGHT POLE SUPPORT (ITEM 632)

In addition to the requirements of specification 632, signal supports shall be painted in accordance with the following:

Powder coating – color: dark bronze

Surface preparation – the exterior steel surface shall be blasé cleaned to steel structures painting council surface preparation specification No. 6 (SSPC-SP6) requirements utilizing cast steel abrasives conforming to the Society of Automotive Engineers (SAE) recommended practice J827. The blast method used is a recirculating, closed cycle centrifugal wheel system with abrasive conforming to SAE shot number S280.

Interior coating – interior surfaces (pole shafts only) at the base end for a length of approximately 2.0 feet shall be mechanically cleaned and coated with a zinc rich epoxy powder. The coating shall be electrostatically applied and cured in a gas fired convection oven by heating the steel substrate to a minimum of 350 degrees Fahrenheit and a maximum of 400 degrees Fahrenheit.

Exterior coating – all the exterior surfaces shall be coated with a urethane or triglycidyl isocyanurate (TGIC) polyester powder to a minimum film thickness of 2.0 mils (0.002”). The coating shall be electrostatically applied and cured in a gas fired convection oven by heating the steel substrate to a minimum of 350 degrees Fahrenheit. The thermosetting powder resin shall provide both intercoat as well as substrate fusion adhesion that meets 5A or 5B classifications of ASTM D3359.

Combination coating galvanized-powder top coat color: Dark Bronze

Surface preparation – prior to being incorporated into an assembled product, steel plates $\frac{3}{4}$ inches or more in thickness shall be blast cleaned when required to remove rolled-in mill scale, impurities and non-metallic foreign materials. After assembly, all weld flux shall be mechanically removed. The iron or steel product shall be degreased by immersion in an agitated 4.5% - 6.0% concentrated caustic solution elevated to a temperature ranging from 150 degrees Fahrenheit to 190 degrees Fahrenheit. It shall next be rinsed clean from any residual effects of the caustic or acid solutions by immersion in a circulating fresh water bath. Final preparation shall be accomplished by immersion in concentrated zinc ammonium chloride flux solution heated to 130 degrees Fahrenheit. The solution's acidity content shall be maintained between 4.5 – 5.0pH. The assembly shall be air-dried to remove any moisture remaining in the flux coat and/or trapped within the product.

Zinc coating – the product shall be hot-dip galvanized to the requirements of either ASTM A123 (fabricated products) or ASTM A153 (hardware items) by immersion in a molten bath of prime western grade zinc maintained between 810 degrees Fahrenheit and 850 degrees Fahrenheit. The entire product shall be totally immersed with no part of it protruding out of the zinc (no double dipping). This is to limit a risk of trapped contaminants containing chlorides and reduce the risk of bare spots (bare spots can occur when flux on the steel surface is burned away by heat of the first dip). Maximum aluminum content of the bath shall be 0.01%. Flux ash shall be skimmed from the bath surface prior to immersion and extraction of the product to assure a debris free zinc coating.

Exterior coating – all galvanized exterior surfaces shall be coated with a urethane or triglycidyl isocyanurate (TGIC) polyester powder to a minimum film thickness of 2.0 mils (0.002"). Prior to application, the surfaces to be powder coated shall be mechanically etched by brush blasting (ref. SSPC-SP7) and the zinc coated substrate preheated to 450 degrees Fahrenheit for a minimum of one hour in a gas fired convection oven. The coating shall be electrostatically applied and cured in a gas fire convection oven by heating the zinc coated substrate to a minimum of 350 degrees Fahrenheit and a maximum of 400 degrees Fahrenheit. The thermosetting powder resin shall provide both intercoat as well as substrate fusion adhesion that meets 5A or 5B classification of ASTM D3559.

CITY OF CLEVELAND PULL BOX SPECIFICATION

(Adapted for this design-build contract)

ITEM 625 – PULL BOX, MISC.: 13" X 24"

ITEM 625 – PULL BOX, MISC.: 17" X 30"

ITEM 625 – PULL BOX, MISC.: 24" X 36"

SIZE:

13" X 24"

1. THE EXTERIOR DIMENSIONS AT THE TOP SHALL BE 13" X 24" (NOMINAL).
2. THE BOX SHALL BE 24" DEEP (NOMINAL) AND SHALL TAPER OUTWARD FROM THE TOP TO THE OPEN BOTTOM.
3. THE INSIDE DIMENSIONS AT THE BOTTOM SHALL BE 11-7/8" X 21-3/8" (MINIMUM).
4. THE BOX (WITHOUT COVER) SHALL WEIGH APPROXIMATELY 64 LBS.
5. THE COVER SHALL BE 13-3/4" X 23-1/4" X 2", AND SHALL WEIGH APPROXIMATELY 34 LBS.

17" X 30"

1. 1. THE EXTERIOR DIMENSIONS AT THE TOP SHALL BE 17" X 30" (NOMINAL).
2. 2. THE BOX SHALL BE 24" DEEP (NOMINAL) AND SHALL TAPER OUTWARD FROM THE TOP TO THE OPEN BOTTOM.
3. 3. THE INSIDE DIMENSIONS AT THE BOTTOM SHALL BE 15-5/8" X 28-5/8" (MINIMUM).
4. 4. THE BOX (WITHOUT COVER) SHALL WEIGH APPROXIMATELY 84 LBS.
5. 5. THE COVER SHALL BE 17-1/2" X 30-1/2" X 2", AND SHALL WEIGH APPROXIMATELY 65 LBS.

24" X 36"

1. 1. THE EXTERIOR DIMENSIONS AT THE TOP SHALL BE 24" X 36" (NOMINAL).
2. 2. THE BOX SHALL BE 24" DEEP (NOMINAL) AND SHALL TAPER OUTWARD FROM THE TOP TO THE OPEN BOTTOM.
3. 3. THE INSIDE DIMENSIONS AT THE BOTTOM SHALL BE 29-13/16" X 41" (MINIMUM).
4. 4. THE BOX (WITHOUT COVER) SHALL WEIGH APPROXIMATELY 124 LBS.
5. 5. THE COVER SHALL BE 24" X 35-5/8" X 3", AND SHALL WEIGH APPROXIMATELY 137 LBS.

LOAD CAPACITY:

THE BOX AND COVER SHALL BE CAPABLE OF SUPPORTING A LOAD OF 20,000 LBS, ON A 10" X 10" AREA, TESTED IN ACCORDANCE WITH WESTERN UNDERGROUND COMMITTEE GUIDE 3.6.

THE COVER DEFLECTION SHALL NOT EXCEED 1/2" AT DESIGN LOAD. THE COVER AND BOX SHALL SHOW NO SIGNS OF DAMAGE AFTER TEN (10) CYCLES AT DESIGN LOAD.

MATERIAL AND CONSTRUCTION:

THE BOX SHALL BE CONSTRUCTED OF FIBERGLASS REINFORCED POLYMER (FRP) WITH ISOPHTHALIT POLYESTER USING THE SPRAY-UP AND ROLL CONSTRUCTION METHOD. THE MATERIAL SHALL HAVE STABILIZERS TO RESIST ULTRAVIOLET (UV) DEGRADATION IN ACCORDANCE WITH ASTM D-790 AND ASTM D-11501-71, SECTION 6, PROCEDURE B. THE TOP RING OF THE BOX SHALL BE MADE OF POLYMER CONCRETE USING A POLYESTER BINDER WITH AGGREGATE FILLERS AND CHOPPED FIBERGLASS WITH A MINIMUM TENSILE STRENGTH OF 1900 PSI. THE RING SHALL HAVE THE SAME UV RESISTANCE AS THE FRP MATERIAL. THE THREADED INSERTS FOR THE COVER BOLTS SHALL BE STAINLESS STEEL.

THE COVER SHALL BE MADE WITH A THICK MOLDING COMPOUND (TMC) USING THE COMPRESSION MOLDING METHOD. THE TMC SHALL CONSIST OF A MINIMUM OF TEN PERCENT (10%) FIBERGLASS IN A CALCIUM CARBONATE AND POLYESTER RESIN MATRIX. THE COVER SHALL BE MARKED WITH THE WORD "TRAFFIC" IN 2" LETTERS, EMBOSSED INTO THE TMC, AND SHALL HAVE A NON-SKID SURFACE AND THE SAME UV RESISTANCE AS THE FRP MATERIAL.

THE COVER SHALL BE SECURED TO THE BOX USING TWO HEX HEAD STAINLESS STEEL BOLTS AND WASHERS WHICH SHALL ATTACH TO THREADED INSERTS IN THE BODY OF THE BOX.

CONDUIT OPENINGS:

OPENINGS IN THE SIDE OF THE PULL BOX, WHICH ARE REQUIRED TO INSERT CONDUIT (INTO THE PULL BOX) SHALL BE DRILLED OR SAWN IN THE FIELD, ONCE THESE LOCATIONS HAVE BEEN DETERMINED. THE OPENINGS SHALL NOT EXCEED THE OUTSIDE DIAMETER OF THE CONDUIT BY MORE THAN FIVE PERCENT (5%). ALL OPENINGS IN THE SIDE OF THE PULL BOX SHALL BE THOROUGHLY GROUTED WITH CEMENT MORTAR AFTER PLACING THE CONDUIT.

NOTE:

THE EXACT LOCATIONS OF PULL BOXES ARE TO BE STAKED AND CHECKED PRIOR TO PLACEMENT TO VERIFY CLEARANCE OF UNDERGROUND FACILITIES AND ANY ABOVE GROUND OBSTRUCTIONS. IF THERE ARE ANY CONFLICTS, THEY ARE TO BE ADJUSTED AS DIRECTED BY THE ENGINEER.

PULL BOXES ARE TO BE PROVIDED A 4" DRAIN TO THE NEAREST STORM INLET, UNDER DRAIN OR OTHER SUITABLE OUTLET FROM THE PULL BOX. TWENTY (20) FEET OF 4" PVC CONDUIT SHALL BE USED AND SHALL BE INCLUDED.

CITY OF CLEVELAND STREET NAME SIGN STANDARDS



Greater Cleveland
Wayfinding Sign Standards

Street Name
Cantilevered

D1

Program Rationale

The street name sign is utilized at intersections 1) where signal mast arm street name signs are not utilized; or 2) in conjunction with mast arm street name signs for intersection corners without signal mast arm street name signs. It identifies street names, and downtown districts (or city approved neighborhood names primarily for pedestrians and secondarily for vehicular traffic. It reinforces district/neighborhood entrances and boundaries, as well as providing directions to districts/neighborhoods along streets serving as boundaries between streets, i.e., E 9th Street.

Design Expression

The sign features a larger 7" cap height more legible street name size using a distinctive bright blue reflectorized background and white message. The message utilizes the Univers 65 font, initial caps, centered horizontally & vertically on the blue and violet segments of the sign. The messages shall be screen printed whereby the background colors are screened and the message "drops out" in white from the high intensity grade reflectorized sheeting. When block address numbers are included for key north/south through streets; this may be applied using pre-spaced machine cut reflectorized vinyl characters flanking the district name.

Sign panels are .080" thk. aluminum with a consistent width (16"). Three panel sizes are available to accommodate varying message lengths. (3'-0", 3'-6", 4'-0")

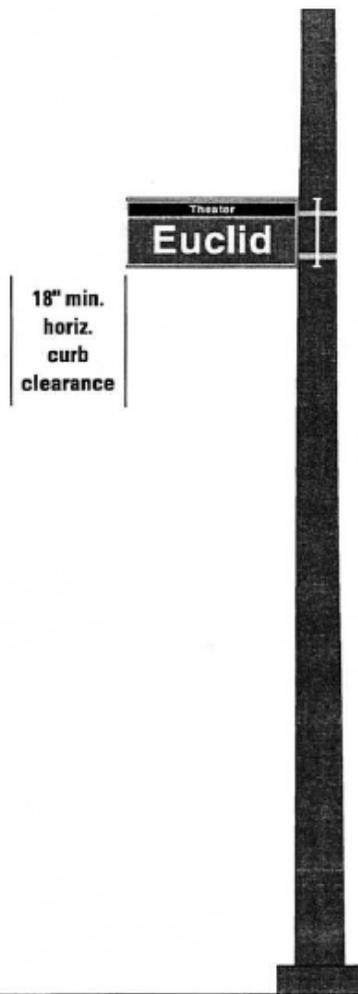
Placement Criteria

Sign panels are roadside mounted to existing light or signal poles utilizing a sign-fix or equivalent bracket and stainless steel strapping. Minimum of 8'-0" vertical clearance and 18" horizontal curb clearance to prevent being hit by trucks.

Signs are located diagonally opposed on light or signal poles at the near side corner of the intersection for the arterial roadway approach.

References

- Appendix A - General Specifications
- Appendix B - Production, Installation, Management Specifications - *Drawing D1-D4.1*
- Appendix C - Program Matrix



Scale 1/2"=1'-0"



Program Rationale

The street name sign is utilized at intersections 1) where signal mast arms exist; or 2) where mast arms exist along only one approach in conjunction with cantilevered pole-mounted street name signs for approaches without signal mast arms. It identifies street names primarily for vehicular traffic as well as pedestrians. It reinforces district/neighborhood identification and provides directions to districts/neighborhoods along streets serving as boundaries between districts, e.g., E 9th Street.

Design Expression

The sign features a larger 12" cap height, more legible street name size, using a distinctive bright blue reflectorized background and white message. The message utilizes the Univers 65 font, initial caps, centered horizontally and vertically on the blue and violet segments of the sign. The messages shall be screen printed, whereby the background colors are screened and the message "drops out" in white from the high-intensity grade reflectorized sheeting. When block address numbers are included for key north/south through streets, these may be applied using pre-spaced machine cut reflectorized vinyl characters flanking the district name.

Sign panels are .080" thk. aluminum with a consistent width (26"). Three panel sizes are available to accommodate varying message lengths (6'-0", 7'-0" and 8'-0").

Placement Criteria

Sign panels are mounted on the mast arms of signal or light poles between the signal head and curb, using stainless steel straps and standard City of Cleveland brackets and hardware mechanically fastened to panel stiffeners bonded to the back of the panel.

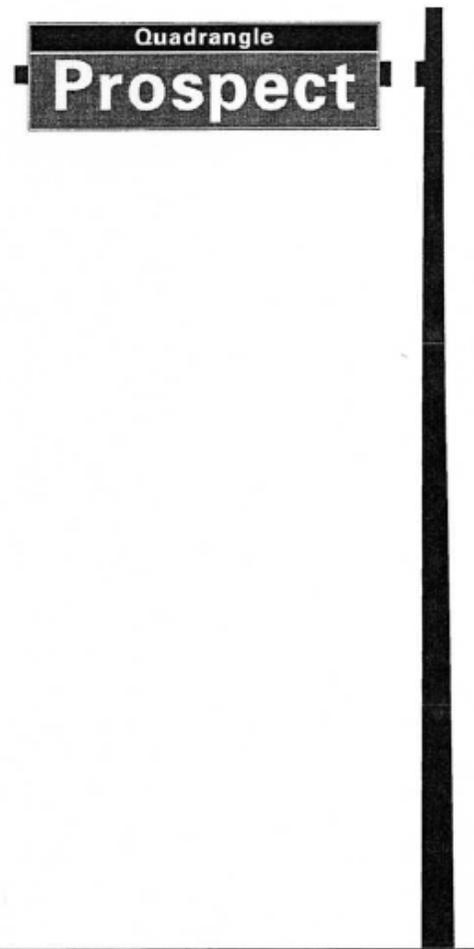
Signs are located at the far side of intersection, facing all approaches whenever possible.

References

Appendix A - General Specifications

Appendix B - Production, Installation, Management
Specifications - *Drawing D1-D4.1*

Appendix C - Program Matrix





Program Rationale

The street name sign is utilized at intersections 1) where signal mast arm street name signs cannot be utilized; or 2) in conjunction with mast arm street name signs for intersection approaches with signal mast arm street name signs. It identifies street names primarily for pedestrians and secondarily for vehicular traffic along secondary lower traffic volume streets.

Design Expression

The sign features a larger 7" cap height, more legible street name size using a distinctive bright blue reflectorized background and white message. The message utilizes the Univers 65 font, initial caps, centered horizontally and vertically on the panel. The messages shall be screen printed, whereby the background colors are screened and the message "drops out" in white from the high-intensity grade reflectorized sheeting.

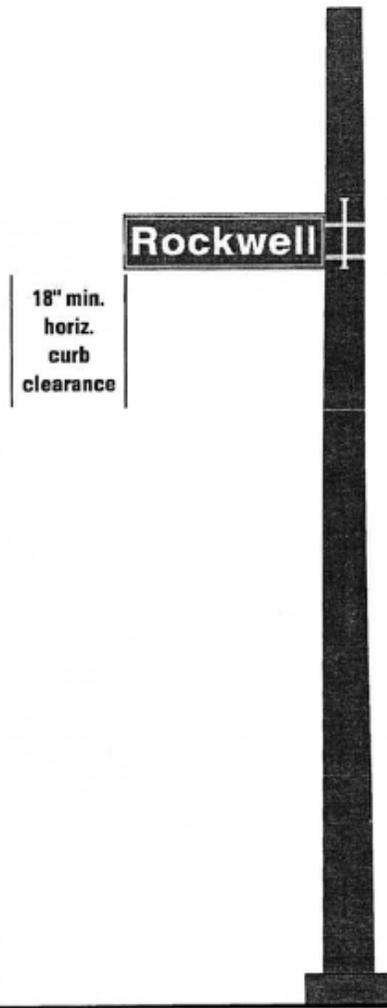
Sign panels are .080" thk. aluminum with a consistent width (12"). Three panel sizes are available to accommodate varying message lengths (3'-0", 3'-6" and 4'-0"). Where existing post strength or windloading is a concern, the Engineer may reduce this to a 10" high panel with 6" copy.

Placement Criteria

Sign panels are roadside mounted to existing light or signal mast arm poles, utilizing a sign-fix or equivalent bracket and stainless steel strapping. Minimum of 8'-0" vertical clearance and 18" horizontal curb clearance to prevent being hit by trucks. Signs are located diagonally opposed on light or signal poles at the near side corner of the intersection for the arterial roadway approach.

References

- Appendix A - General Specifications
- Appendix B - Production, Installation, Management Specifications - *Drawing D1-D4.1*
- Appendix C - Program Matrix



Scale 1/2"=1'-0"



Program Rationale

The street name sign is utilized at intersections 1) where signal mast arms exist; or 2) in conjunction with cantilevered pole-mounted (Type D.3 signs) street name signs for approaches without signal mast arms. It identifies street names primarily for vehicular traffic as well as pedestrians along secondary lower traffic volume streets.

Design Expression

The sign features a larger 12" cap height, more legible street name size using a distinctive bright blue reflectorized background and white message. The message utilizes the Univers 65 font, initial caps, centered horizontally and vertically on the panel. The message shall be screen printed, whereby the background colors are screened and the message "drops out" in white from the high-intensity grade reflectorized sheeting.

Sign panels are .080" thk. aluminum with a consistent width (20"). Three panel sizes are suggested to accommodate varying message lengths (6'-0", 7'-0" and 8'-0").

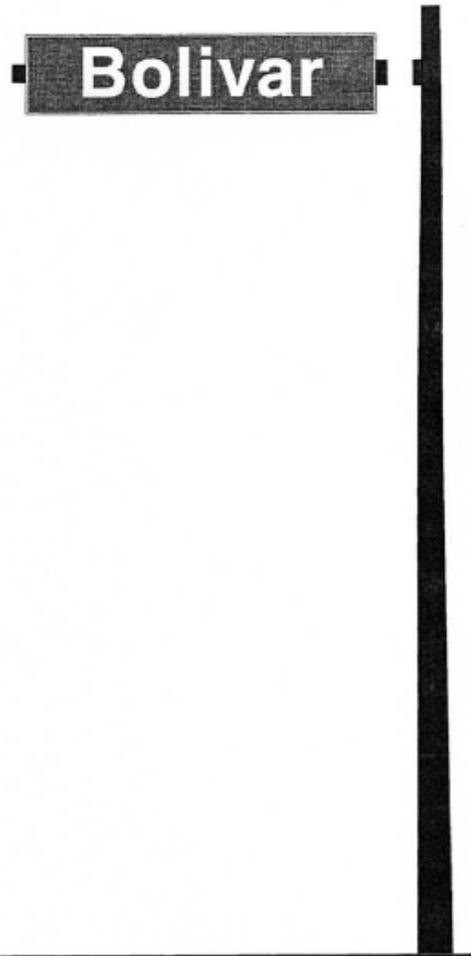
Placement Criteria

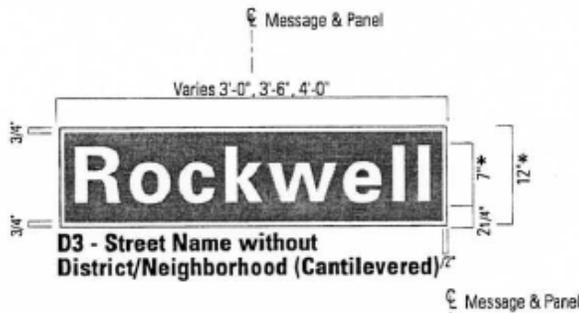
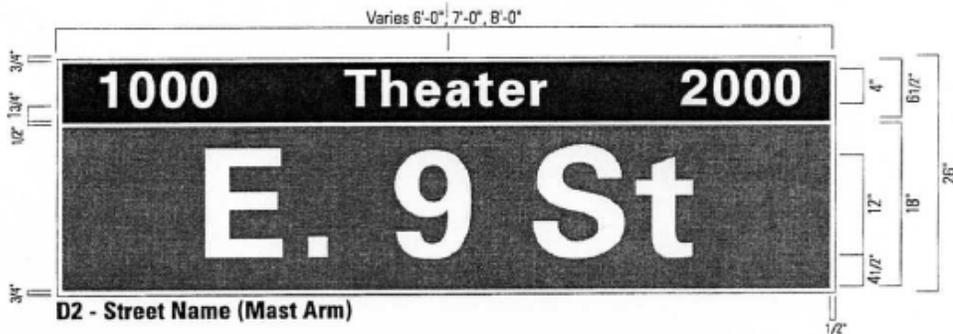
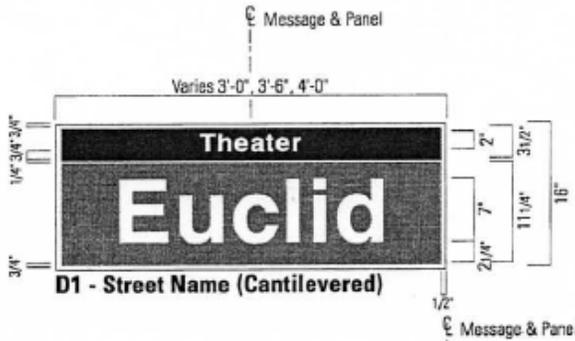
Sign panels are mounted on mast arms of signal or light poles between the signal head and curb, using stainless steel straps and standard City of Cleveland brackets and hardware mechanically fastened to panel stiffeners bonded to the back of the panel.

Signs are located at the far side of the intersection, facing all approaches whenever possible.

References

- Appendix A - General Specifications
- Appendix B - Production, Installation, Management Specifications - *Drawing D1-D4.1*
- Appendix C - Program Matrix





NOTES:

1. All panels .080" thk. aluminum with 3M High Intensity Grade reflective sheeting.
2. Background colors/messages reverse screen printed or equivalent color transparent film.
3. Block addresses, if used, applied with machine-cut reflective sheeting.
4. Use heavy duty Sign-Fix bracket for cantilever mounting.

5. Colors:

- Name bkgd: Blue Scotchlite ink #863 or equivalent transparent film.
 - District bkgd: Violet Scotchlite ink #893 or equivalent transparent film.
 - Message: Scotchlite High Intensity Grade silver #3870.
- * D3 Sign - Where existing post strength or windloading is a concern the engineer may reduce to a 10" high panel with 6" copy.



The Univers family is the official letter style for the Greater Cleveland Master Signage Program. This style is readily available from manufacturers of signs, or sign making equipment and features a wide variety of proportions and stroke widths adaptable to the various program applications. Univers Bold is utilized throughout all applications as sign messages and text. Univers Condensed Bold is utilized on Pedestrian Directional signs and printed maps. Univers Condensed is utilized primarily on maps and other printed applications.

Among various manufacturers and letter cutting equipment, there is not total uniformity as to letter form. This is especially true with Univers Condensed. It is important that there be a match with the examples shown in this manual. Univers Condensed has a lighter stroke width for internal illumination to minimize the "halation effect", where the stroke will appear to glow and enlarge.

All non-tactile sign word messages are to be in initial upper case followed by lower case to enhance word signature readability unless specified otherwise. Examples of exceptions are "EXIT" and "DO NOT ENTER", where these word signatures are learned in all upper case. Other exceptions are to distinguish a heading from body copy or to emphasize the importance of a word or phrase.

As required by ADA, any tactile messages shall be all upper case. Univers Bold braille messages do not have to be all upper case except to emphasize the importance of a word or phrase.

**ABCDEFGHIJK
LMNOPQRSTU
VWXYZ.,-:;! '&?
abcdefghijklmnop
opqrstuvwxyz
\$1234567890**

Univers Bold - 65

**ABCDEFGHIJKLMN
OPQRSTUVWXYZ
abcdefghijklmnopq
rstuvwxyz.,-:;! '&?
\$1234567890**

Univers Condensed Bold - 67

**ABCDEFGHIJKLMN
OPQRSTUVWXYZ
abcdefghijklmnopq
rstuvwxyz.,-:;! '&?
\$1234567890**

Univers Condensed Regular - 67



The final layout and/or assembly of letters on a sign panel requires careful letter spacing guidelines to assure maximum legibility.

This manual recommends normal spacing for signs that are ambiently lighted or externally lighted. Normal spacing should result in approximately one stroke width between straight vertical letters such as (i) and (n). All other letter spacing combinations should be visually proportional to one stroke width. Tight letter spacing shall not be considered and is not within the guidelines of this manual since legibility would be compromised.

This manual recommends wide spacing for signs that are internally-illuminated and normal spacing for letters that are reflective. Wide spacing should result in approximately 1 1/4 (1.25) times the stroke width.

Spacing between words is equally as important to achieve good legibility as inter-letter and inter-line spacing. Word spacing shall be 3/4 (.75) times the cap letter height. Thus, lettering using 4" cap letters will have 3" between words. This space guideline also applies to abbreviations, initials, etc.

Line spacing shall be 1/2 (.50) times the cap letter height for words of a related message line such as "Metroparks Zoo". Spacing between unrelated message lines shall be 1 times the cap letter height.

Signage margins for left, right, top and bottom spacing shall be a standard 3/4 (.75) times the cap letter height and for exceptions where there are space limitations, 1/2 (.50) times cap letter height.

Univers 67 Condensed

Spacing

Univers 65

Spacing

Spacing NOT APPROVED (Tight)

Univers 67 Condensed

Spacing

Univers 65

Spacing

Spacing APPROVED (Normal) for ambiently & externally illuminated & reflective letters

Univers 67 Condensed

Spacing

Univers 65

Spacing

Spacing APPROVED (Wide) for internally illuminated letters