

**BUREAU OF ENGINEERING**

**PART G**

**STORM DRAIN DESIGN**

**OCTOBER 1986**

**ROBERT S. HORII**  
City Engineer

## **GENERAL PROVISIONS**

### **PURPOSE**

The Bureau of Engineering Manual is published as a reference and training guide for all Bureau employees.

The Manual summarizes and outlines policy, practices and procedures that have been developed to increase the efficiency of Bureau operations. Its purpose is to inform and instruct employees about the current standards in Bureau practice. The standards have been adopted to encourage uniformity in the work of division and district offices of the Bureau of Engineering. The various sections of the Manual as dated in the upper right hand corner of each page supersede all prior dated Standard Practice Instructions, Office Standards, Special Orders and other directives relating to material covered.

### **SCOPE**

The Manual covers all phases of work in the Bureau. Elementary information available in standard engineering and public administration textbooks is not included. Graphs, office standards, and data applicable to City usage are included to assist in the solution of typical problems; however, it is not practical to cover all operations in great detail.

The Manual is a guide. It is not a substitute for professional experience. Sound judgment must be exercised in the application of Manual provisions to specific circumstances. For routine operations and procedures, the Manual instructions should be the standard. The contents do not preclude use of different methods when special or emergency conditions warrant and when proper authorization is obtained.

If a major deviation from the standard is necessary or desirable, the Engineer of Design should be informed by memorandum, so that it can be evaluated as a possible Manual change.

### **ORGANIZATION AND RESPONSIBILITY**

The Manual will be published in sixteen parts. Each part will be a separate volume of related material. The Engineer of Design has the primary responsibility for coordination and preparation of the material or revisions to the Manual. The divisions and districts designated below will, upon request,

assist the Engineer of Design in preparing text and illustrations for the Manual:

<b>PART</b>	<b>TITLE</b>	<b>ASSIGNED DIVISION / DISTRICT</b>
A	Management Administration	Design Research and Standards Administration
B	Office Guide	Administration
C	Operations and Control	Assessment Central - One-Stop Project Management
D	Land Development	Central - One-Stop Street Opening and Widening
E	Street Design	Design Research and Standards
F	Sewer Design	Design Research and Standards
G	Storm Drain Design	Design Research and Standards
H	Structural Design	Structural Engineering
I	Drafting and Cartography	Design Research and Standards Street Opening and Widening
J	Survey	Survey
K	Real Estate	Real Estate
L	Architecture	Architectural
M	Construction	Construction
N	Geology and Soils	Construction - Geology and Soils
O	Systems	Systems Planning and Development

**REVISION**

The Manual is revised as needed to keep it current and to include new or changed policy, data and/or methods.

In general, revisions are implemented by issuance of a "Manual Revision Transmittal "(Form Eng. 5.911) accompanying revised

sheets to be inserted in the Manual. Superseded sheets should be discarded. The transmittals are numbered consecutively by parts and will indicate the scope of the revisions, any superseded Special Orders, and/or Memoranda and the reasons why changes are being made in the Manual.

In some cases Special Orders may be issued which supersede sections of the Manual and serve as interim instructions. In these cases, revisions to the Manual should be prepared as soon as possible after issuance of the Special Order.

Detailed instructions for Manual revisions will be included in Part C, Operations and Control.

### **FORMAT**

1. The Manual is organized on the Closed Decimal System as illustrated in [Figure GP1](#).
2. The Manual and revisions are typed on sheets with headings illustrated by [Figure GP2](#). Each major division (e.g., 140, 230, 670) shall start on a new sheet. Long, self contained, secondary divisions (e.g., 142, 234, 678) may start on a new page when appropriate.
3. Each part of the Manual consists of the following:
  - a. Title Sheet - Signed by City Engineer and shall be revised each time there is a revision of that part.
  - b. General Provisions - Identical for all parts.
  - c. Preface - A brief general statement of the scope of that part.
  - d. General Outline - A list of chapters by general subject matter, the Index and an appendices listing.
  - e. Table of Contents - A table at the beginning of each chapter listing section numbers, subjects, and dates of revision.
  - f. List of Figures - A list when appropriate following the Table of Contents. Unless otherwise noted, the figures are inserted at the end of each chapter.
  - g. Index - Follows the last chapter for each part.
  - h. Appendix - As needed for important references too lengthy to incorporate in the text.

## **DISTRIBUTION**

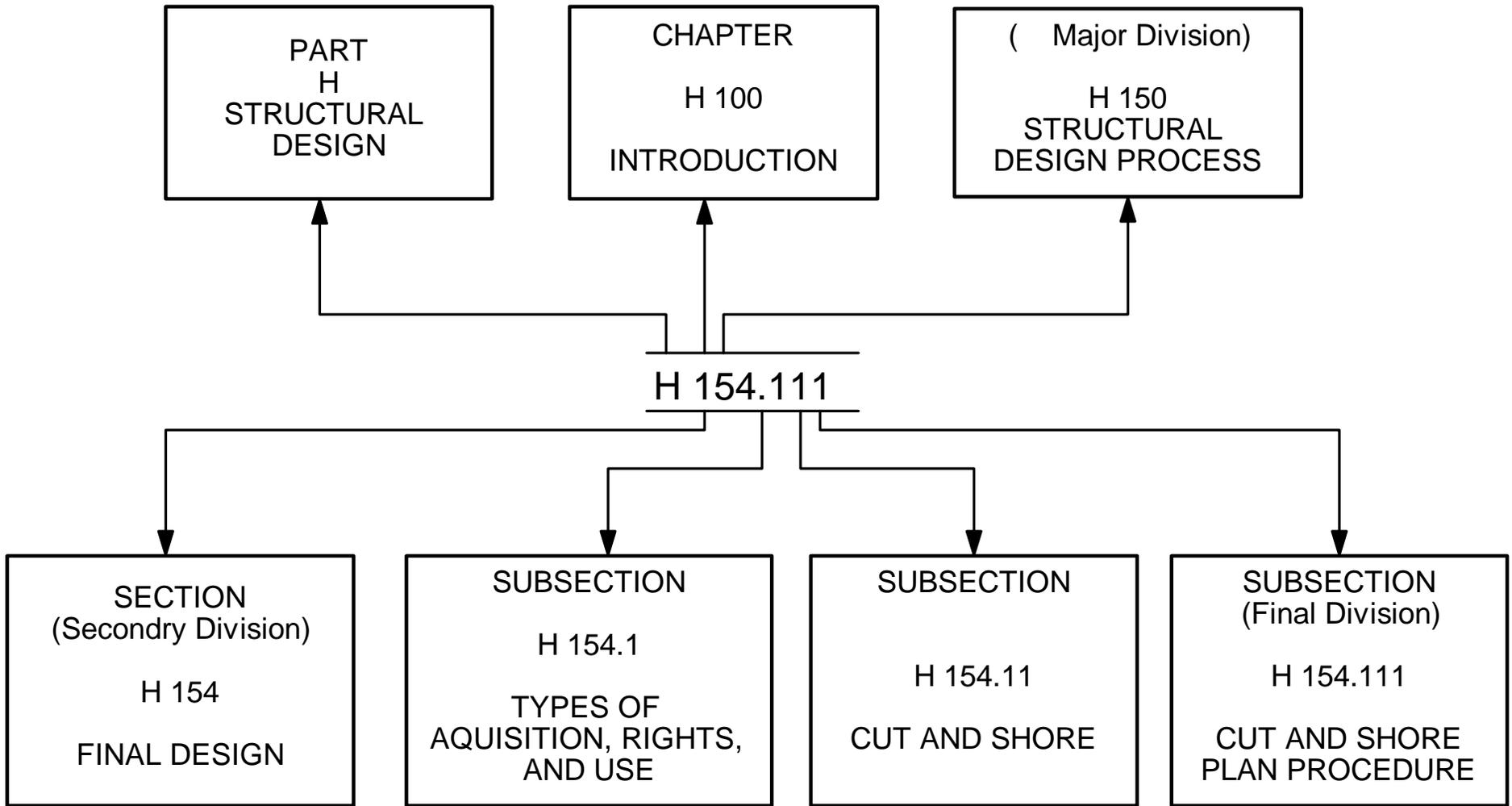
### **TO BUREAU OF ENGINEERING OFFICES**

Each division and district office is assigned at least one complete copy of the Manual (16 parts). Additional parts as necessary are assigned to those offices with personnel who require them for frequent use.

Assignment and distribution of the Manual and its revisions are the responsibility of the Engineer of Design.

### **TO OTHER BUREAUS, DEPARTMENTS, AGENCIES AND INDIVIDUALS**

The Manual is intended primarily for use by Bureau personnel. Because costs of reprinting are high, the supply of full-size Manuals is limited and therefore restricted to Bureau personnel. However, the Manual is available on microfiche for sale at a nominal price by the Administration Division. Persons requiring full-size copies are advised to purchase the Manual on microfiche and have it reproduced in full size by a private reproduction firm.



SAMPLE

FIGURE GP1

## E 311 VOLUME

The specific types of traffic volume counts that are generally used by the street designer are as follows.

### E 311.1 HOURLY TRAFFIC

The traffic pattern for most City streets shows considerable variation in traffic volume during different hours of the day (such as rush hour) and even a greater volume variation throughout the year. The most ....

**DRH** (in vehicles per hour) finds its greatest application in:

- a. Determining the magnitude of peak period.
- b. Evaluating capacity deficiencies.
- c. Establishing traffic controls, since volume is one of the warrants for the:
  1. Installation of signs, signals, and markings.
  2. Designation of through streets, one-way streets, unbalanced flow, and traffic routing.
    - (a) Prohibition of parking, stopping, and turning.
    - (b) Geometric design or redesign of streets and intersections.
      - (1) For example, a tabulation of traffic by direction of movement shows
      - (2) In contemplating the design of a highway and in determining its capacity, the DHV for one direction .....

### DESIGN SPEEDS FOR CITY STREETS

Class of Street	Design Speed
Major	50 mph
Secondary	40 "
Collector	40 "
Local - Flat	30 "
Local - Hillside	25 "

1" Margin

Table 313

(Line 60)