TABLE OF CONTENTS

I. INTRODUCTION---------- 1-1

II. CONCRETE---------- 2-1

A. Concrete Materials---------- 2-1

1. Aggregates---------- 2-2

2. Cement---------- 2-4

3. Water---------- 2-7

4. Admixtures---------- 2-8

B. Concrete Terms---------- 2-11

C. Concrete Properties---------- 2-12

1. Strength---------- 2-12

2. Air Content---------- 2-14

3. Slump---------- 2-14

4. Water/Cement Ratio---------- 2-14

5. Temperature---------- 2-15

6. Unit Weight---------- 2-15

7. Workability---------- 2-16

D. Concrete Mixes---------- 2-17

III. DESIGN---------- 3-1

A. Project Plans---------- 3-1

1. Title Sheet, Location Map, & Legend - A Sheets-------- 3-1

2. Typical Cross Sections- B Sheets---------- 3-1

3. Estimate of Quantities and General Information- C Sheets 3-1

4. Mainline Plan and Profile Sheets- D Sheets---------- 3-2

5. Side Road Plan and Profile Sheets- E Sheets---------- 3-2

6. Interchange Geometrics- K Sheets---------- 3-2

7. Intersection Geometrics- L Sheets---------- 3-2

B. Joints---------- 3-2

1. Joint Types---------- 3-3

2. Saw cuts---------- 3-6

IV. TRAFFIC CONTROL & SAFETY---------- 4-1

A. Traffic Control---------- 4-1

B. Safety---------- 4-1

V. EQUIPMENT---------- 5-1

A. Trimmer and Roller---------- 5-1

B. Transporting Vehicles---------- 5-2

1. Dump Trucks---------- 5-2

2. Agitator Trucks---------- 5-3

3. Ready Mix Trucks---------- 5-3
C. Placing and Consolidating---------- 5-4
1. Belt Placer---------- 5-4
2. Iowa Special---------- 5-5
3. Paver---------- 5-5
D. Finishing---------- 5-6
E. Texturing---------- 5-7
1. Microtexture---------- 5-7
2. Macrotexture---------- 5-8
F. Curing---------- 5-8
G. Sawing---------- 5-9
1. Light Early Saws---------- 5-9
2. Conventional Saws---------- 5-9
3. Span Saws---------- 5-10
H. Sealing---------- 5-10

VI. SUB GRADES AND BASES---------- 6-1
A. Sub Grade Treatment (Stabilization)---------- 6-1
1. Select Soil---------- 6-2
2. Special Backfill---------- 6-2
3. Polymer Grid---------- 6-3
4. Fly Ash Stabilization---------- 6-4
B. Base and Subbase---------- 6-5
1. Granular Subbase---------- 6-5
2. Modified Subbase---------- 6-6
3. Special Backfill---------- 6-7

VII. PRIOR TO PAVING---------- 7-1
A. Control---------- 7-1
1. Survey Stakes---------- 7-2
2. Stringline---------- 7-3
B. Proof Rolling---------- 7-4
C. Check Subgrade---------- 7-5
D. Check Granular Subbase---------- 7-6
E. Pad Line, Track Line, and Form Line---------- 7-7
F. Placement of Dowel Baskets---------- 7-8
G. Paver Checks---------- 7-10
H. Determination of Subgrade and Subbase Elevations---------- 7-11
1. Subgrade---------- 7-11
2. Subbase---------- 7-13

VIII. PAVING OPERATIONS---------- 8-1
A. Wetting the Grade---------- 8-1
B. String Line Control---------- 8-1
C. Deposit and Spread Concrete---------- 8-2
D. Place and Consolidate---------- 8-2

E. Finish---------- **8-2**
1. Mechanical Floats---------- **8-3**
2. Straight Edge and Hand Float---------- **8-3**
3. Edge Slump---------- **8-3**
4. Water on the Surface---------- **8-4**
5. Rumble Strips---------- **8-5**
6. Scoring the Joint---------- **8-5**
F. Texture---------- **8-5**
1. Microtexture---------- **8-6**
2. Macrotexture---------- **8-6**
G. Curing---------- **8-7**
H. Headers---------- **8-8**
I. Hand Pours---------- **8-9**
J. Cold Weather Protection---------- **8-10**

IX. ROLE OF THE INSPECTOR DURING PAVING---------- **9-1**
A. Traffic Control---------- **9-1**
B. Wetting the Grade---------- **9-2**
C. Concrete Delivery---------- **9-3**
1. Delivery Time---------- **9-3**
2. Added Water---------- **9-3**
3. Mixing---------- **9-4**
4. Clean Boxes---------- **9-4**
D. Placement---------- **9-5**
E. Concrete Testing---------- **9-5**
1. Air Content---------- **9-5**
2. Slump---------- **9-6**
3. Mix Temperatures---------- **9-7**
F. Pavement Testing---------- **9-7**
1. Edge Slump---------- **9-7**
2. Pavement Width---------- **9-8**
3. Cross Slope---------- **9-9**
4. Depth Check---------- **9-10**
5. Yield---------- **9-11**
G. Vibration---------- **9-12**
H. Steel Placement---------- **9-14**
I. Finish---------- **9-16**
J. Texture---------- **9-17**
K. Curing---------- **9-18**
L. Station Markers---------- **9-20**
M. Concrete Strength---------- **9-20**
1. Beams---------- **9-20**
2. Maturity---------- **9-21**
N. Date of Pour---------- **9-21**
O. Monitor Contractor's Haul Roads---------- **9-22**

P. Documentation---------- **9-23**
Q. Monitor Contractor's Housekeeping---------- **9-24**
R. Non-Compliance Notice---------- **9-24**

X. POST CONSTRUCTION CHECKS---------- **10-1**
A. Saw Cuts---------- **10-1**
1. Light Early Saws---------- **10-2**
2. Conventional Saws---------- **10-2**
B. Sealing Joints---------- **10-3**
C. Texture---------- **10-4**
D. Smoothness---------- **10-5**
E. Strength---------- **10-6**
1. Beams---------- **10-6**
2. Maturity---------- **10-7**
F. Steel Placement---------- **10-9**
G. Coring---------- **10-10**
1. Locating Cores---------- **10-10**
2. Deficient Areas---------- **10-11**
3. Length Evaluation---------- **10-11**
4. Reporting---------- **10-11**

XI. ASSOCIATED CONSTRUCTION ACTIVITIES---------- **11-1**
A. Earth Shoulder Construction---------- **11-1**
B. Longitudinal Subdrains---------- **11-2**
1. Excavation---------- **11-2**
2. Placement---------- **11-3**
3. Porous Backfill---------- **11-3**
4. Outlets---------- **11-4**
5. Restoring the Shoulder---------- **11-5**
C. Granular Shoulders---------- **11-5**

XII. URBAN PAVING---------- **12-1**
A. Boxouts---------- **12-1**
B. Curbs---------- **12-2**
C. Hand Pours---------- **12-2**
1. Subgrade/Subbase Prep---------- **12-3**
2. Form Placement---------- **12-3**
3. Objects in or Under Pavement---------- **12-4**
4. Concrete Placement---------- **12-4**
5. Finishing---------- **12-5**
D. Obstructions---------- **12-5**
E. Jointing---------- **12-6**
F. Access Locations---------- **12-6**

APPENDIX