

Construction Earthworks

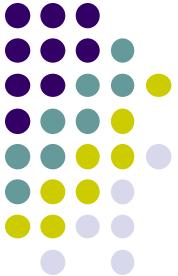
INDOT CTP and Section 200 SS





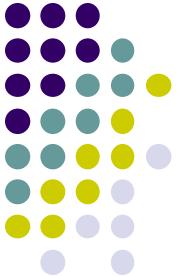
Construction Earthworks

- Where to Find Information
- Clearing and Grubbing
- Removal of Structures & Obstructions
- Excavation and Embankment
- Geotechnical Instrumentation
- Subgrade
- Finishing Shoulders, Ditches & Slopes



Construction Earthworks

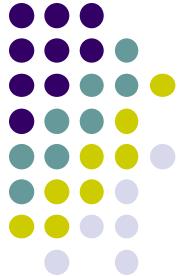
- Final Trimming and Cleaning
- Geogrid
- Chemical Modification of Soils
- Testing Methods
- Earth Slide and Failures
- GPS Grading and Control



Where to Find Information

www.in.gov/indot

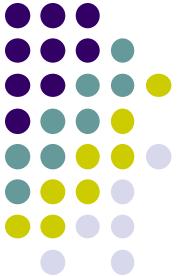
- Doing Business with INDOT
 - Standards and Specifications
 - Standard Specifications
 - Standard Drawings
 - Special Provisions
 - Construction Memorandums



Where to Find Information

www.in.gov/indot

- Doing Business with INDOT
 - Other Business
 - Materials Management
 - Approved Materials
 - Frequency of Sampling and Testing Manual
 - Indiana Test Methods and Procedures Index

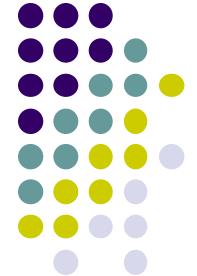


Where to Find Information

- www.in.gov/indot
 - Programs / Events
 - Other Programs
 - Construction Earthworks

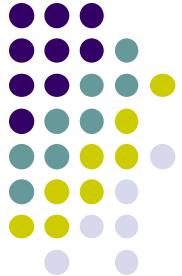
Clearing and Grubbing

Stand. Spec. 201



- Clearing and Grubbing
 - Surface Objects i.e. Trees, Stumps, etc.
- Scalping
 - 4" Removal of Roots, Grass, etc.
- Hedge Removal
 - Pulled or Grubbed for Permanent Removal

Removal of Structures & Obstructions Stand. Spec. 202



- Bridges, Culverts and Drainage Structures
- Pipe and Tile Drains
- PCCP, Sidewalks, Curbs, etc.
- Houses and Buildings
- Inspection and Removal of Asbestos

Removal of Structures & Obstructions Stand. Spec. 202



- Underground Storage Tanks
- Contaminated Soil and Groundwater
- Other Regulated Materials
- Transportation and Disposal of Regulated Materials

Excavation and Embankment

Stand. Spec. 203



- Types of Excavation
- Construction Requirements
- Method of Measurement
- Basis of Payment

Types of Excavation

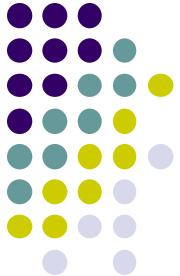
Stand. Spec. 203



- Common Excavation
- Rock Excavation
- Unclassified Excavation
- Peat Excavation
- Waterway Excavation
- Class Y Excavation
- Borrow or Disposal

Borrow and Disposal

Stand. Spec. 203



- Recurring Special Provision 203-R-550
 - Commercial or Permitted Site
 - Wetland and Archaeological
 - Erosion Control
 - Submitted to INDOT 14 Days Prior
- Standard Specification
 - Dimensions
 - Finishing
- Initial and Final Sections

Construction Requirements

Stand. Spec. 203



- General Requirements
 - Clearing
 - Compacting and Proofrolling
 - Uniform Lifts
 - Material and Condition of Existing Lift
 - Width of Lifts
 - Drainage
 - Benching
 - Capping of Slopes



Construction Requirements

Stand. Spec. 203



- Embankment Construction Materials
 - Rock
 - Shale and Soft Rock
 - Shale and Thin Limestone
- Embankment Construction Over:
 - Existing Roadbeds

Construction Requirements

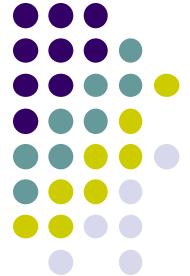
Stand. Spec. 203



- Equipment
 - Hauling
 - Spreading
 - Compacting
 - Moisture Control

Method of Measurement

Stand. Spec. 203



- Contract Quantity
- Measured Quantities
- Measurement on a Linear Basis
- Measurement of Excavation on a Weight Basis
- Measurement of Embankments
- Measurement of Borrow
- Lump Sum

Basis of Payment

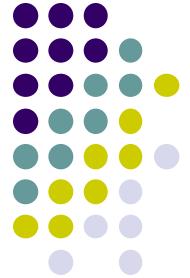
Stand. Spec. 203.28



- Existing Pay Items
- If No Existing Pay Items
 - Existing Concrete Not Shown in Plans
 - Unsuitable Material
 - Rock
 - Common Excavation
 - Borrow
 - Class Y Excavation

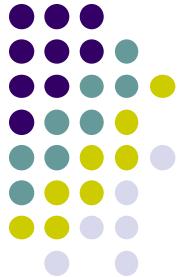
Geotechnical Instrumentation

Stand. Spec. 204



- Settlement Plates
- Settlement Stakes
- Lateral Stakes
- Standpipe Piezometer

Subgrade Stand. Spec. 207

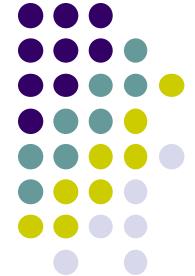


- Four Methods
 - Chemical Modification
 - Moisture Density
 - Coarse Aggregate No 53
 - Coarse Aggregate No 53 on Geogrid
- Seven Types
 - I, IA, II, IIA, III, IIIA and IV





Finishing Shoulders, Ditches and Slopes Stand. Spec. 208



Final Trimming and Cleaning Stand. Spec. 210

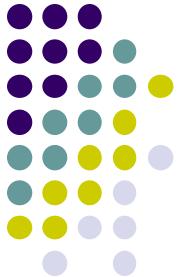
- Finishing Shoulders
- Finishing Ditches
- Finishing Slopes







Geogrid Stand. Spec. 214

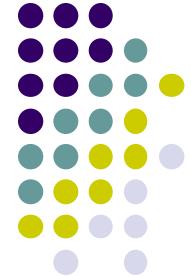


- Foundation Preparation
 - Clearing
- Geogrid Placement
 - Keep taut
 - Proper overlap
 - Avoid damage/repair if necessary
- Fill Placement
 - Cover in a timely manner
- Method of Measurement/Basis of Payment



Chemical Modification of Soils

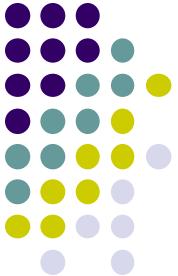
Stand. Spec. 215



- Contractor's Responsibilities
- Weather Limitations
- Preparation of Soils
- Spreading of Chemical Modifier
- Mixing
- Compaction
 - Recurring Special Provision 215-R-543
- Acceptance Testing

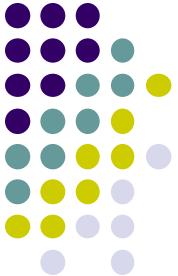






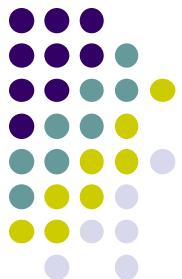
Testing Methods

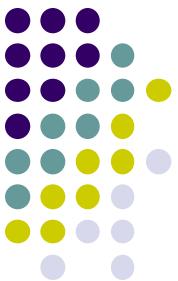
- Obtaining Samples (IT530)
- Proctors and One Point Proctors
- Nuclear Gauge
- Sand Cone
- Moisture
- Dynamic Cone Penetrometer
- Proofrolling



Earth Slides and Failures

- How to Recognize
- Basic Repair
 - Riprap and Geotextiles
 - Soil Nailing
 - Retaining Wall Systems
 - Soldier Piling
 - Drilled Shafts with Tie Backs















GPS Grading Control

- Greatly reduces re-staking
- Must be constantly monitored
 - Check control
 - Check blade wear
- High accuracy horizontally, less accurate at times vertically
 - Can be integrated with laser grading
- Contractor must provide necessary control