The Explorative Project

Explorative Project

- 5 members per group
- Each group is responsible for developing a complete transit system plan for the city of Changzhi, Shanxi province
- Deliverables
  - PPT and (8+5min) oral presentation on 15th and 16th week (6/5, 6/12)
  - Formal report to be submitted online by 18th week (6/28)
  - Specify individual contributions (e.g. chapters)
- Group assignment preference (if any)
  - To TA <lianys18@foxmail.com> or WeChat no later than (4/9)
- Flipped Class Mode: Q&A Discussions (5/15)

Explorative Project

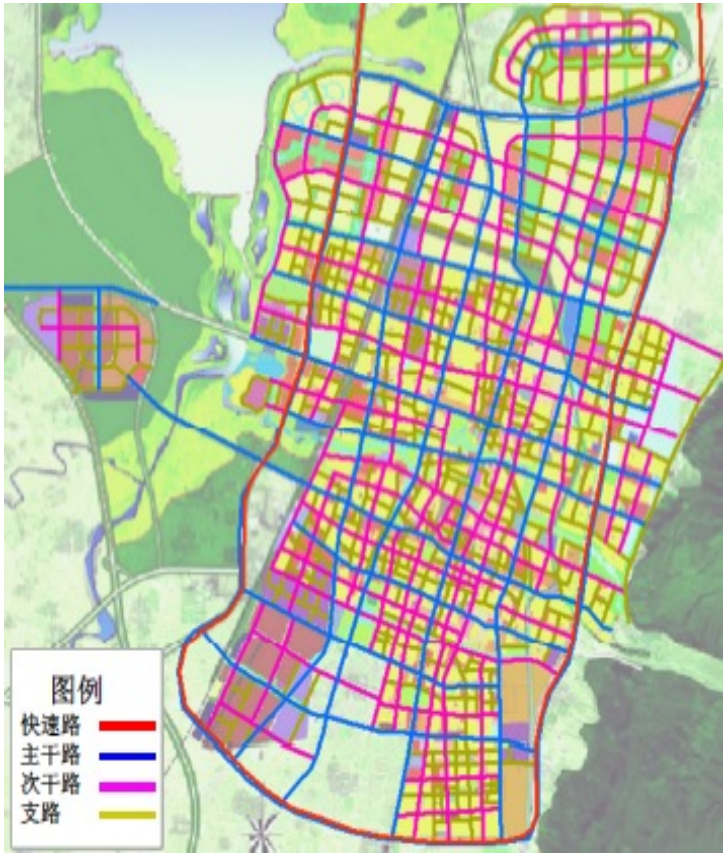
- Map of Changzhi

- **Location**
- **Land**
  - 150km length, 140km width
  - Total area : 13955km^2
- **Population** (end of 2016)
  - 3,435,400 in the whole area
  - 800,400 in the urban area

Explorative Project

- Map of the Changzhi

The Location of Changzhi City



The road network of Changzhi City

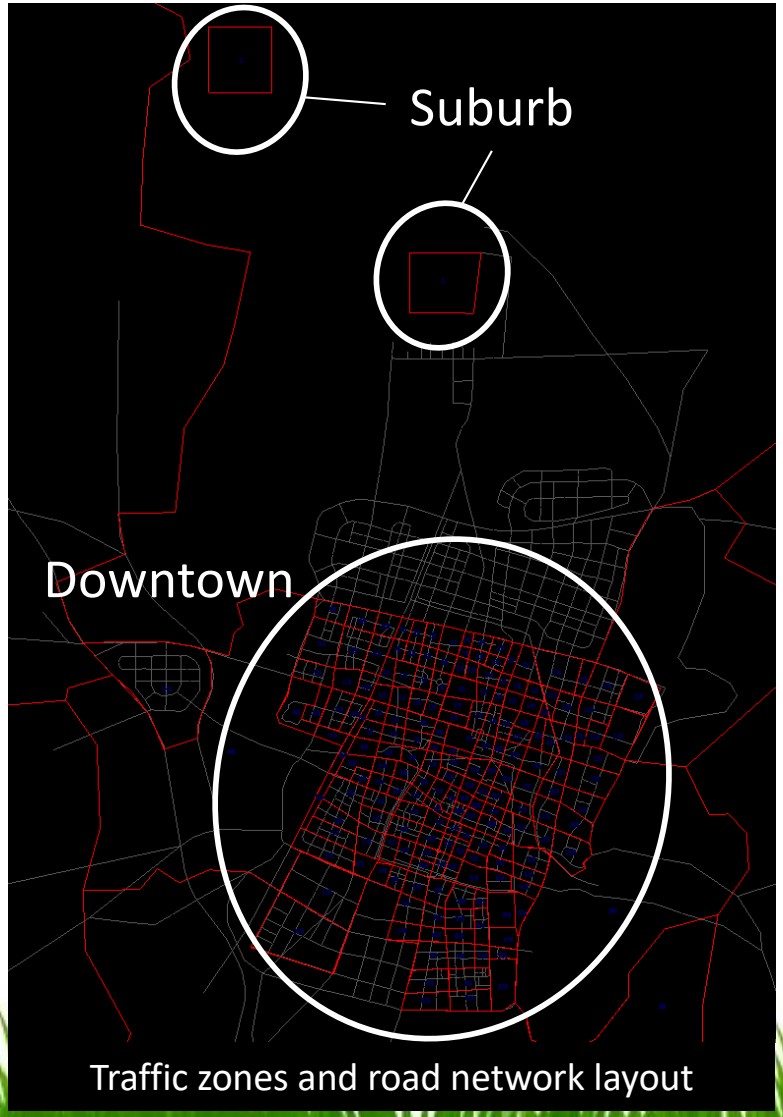
The transit network of Changzhi City

Suggested Tasks A: Data Collection

- Region Characteristics
  - Collect information about the area of design (e.g., district size, geographical shape, roadway network layout, signal timing plan at intersections).
- Vehicle Characteristics
  - Collect information about operational characteristics and costs of possible modes of transit (e.g., subway, transit, BRT). Examples of operational information include but are not limited to: cruising speed, lost time per stop (due to acceleration/deceleration, boarding/alighting passengers), and passenger walking speed. Examples of cost information include but are not limited to: value of user time, operating cost (e.g., per bus-km and/or bus-hour), and prorated infrastructure investment (e.g., per km-hr).
- Demand Characteristics
  - Determine the trip generations and attractions of downtown, suburb and peripheral (e.g., in the form of demand densities) to/from each part, during peak and off-peak hours for either a typical weekday or a weekend day. Also, determine demand densities for traveling within downtown for peak/off-peak hours on the same weekday or weekend day.
- Raw Data Processing
  - Observe the pattern of the three types of demand and determine the "zones of analysis." Be open-minded about the geographical boundaries. If a zone contains areas with drastically different demand densities, consider splitting it into multiple (e.g., up to 2-3) parts, each with approximately uniform demand. If some neighboring zones are very similar, you may also consider merging them in your analysis. Pick at least one representative demand scenario (e.g., weekday rush-hour) for the rest of your analysis.

Suggested Tasks B: Network Planning and Design

- Design a transit system for Changzhi city, and provide service for passengers traveling within **downtown and suburb** part of the city.
  - Select the suitable vehicle technology (e.g., subway, BRT, regular transit) and plan the network structure. Consider Grid, Hub-and-Spoke or Hybrid network structures as alternatives.
  - Compute the hourly agency cost for each network structure.
  - Formulate the worst case and average passenger travel times in terms of system parameters and design variables.



Traffic zones and road network layout

Suggested Tasks B: Network Planning and Design

- Design a transit system for Changzhi city, and provide service for passengers traveling within **downtown and suburb** part of the city (cont'd).
  - Select suitable standard(s) (e.g., the average travel time within the area is no more than X hours) and optimize the transit system design (e.g., network layout, route spacing, stop spacing, and headways). You may do so numerically using Excel or a similar solver program.
  - Implement the transit network design by matching it with existing city streets (e.g., transit routes, stop locations), using the optimal design values from the last step as guidelines.
  - (Optional) Design the time schedule of the transit system.
  - (Optional) Try to solve the last mile problem in your transit system by introducing some new travel options, such as shared bike, demand responsive transit (DRT), etc.

Suggested Tasks C: Presentation and Report

- In your presentation (8+5), make sure to include the overall network structure for the entire Changzhi city.
- Submit a formal report describing the tasks and your findings. Extensive calculations should be placed in an appendix (and referred to in the report)
- Specify individual contributions (e.g. chapters)

Instructions on the Data

- Students are provided with the following data:
  - The OD distribution between the traffic zones
    - “OD Demand of Changzhi City.xlsx”
    - **Different groups may get different OD demands**
  - The layout of the traffic zones and the road network
    - “Traffic Zones and Road Network of Changzhi City.dxf”
    - Can be opened with AutoCAD 2014 or a later version

* The provided data will be released when the group assignment is confirmed.