

Safety Hazard Analysis

11. Please analyze the potential safety hazards in the area and raise specific problems based on the existing situation, including potential risks in infrastructure, personnel flow, transportation, etc. (SZU)

Answer:

Transportation and Road Safety

- **Road Complexity:** Likang Road (arterial road) intersects with roads of different hierarchies such as Weixin Road and Weipin Road (internal roads). Significant differences in traffic speed increase the likelihood of traffic accidents.
- **High Pedestrian Density Areas:** The area contains numerous bus stops, including those serving the College of Engineering, student dormitories, and Shenzhen University General Hospital Terminus. During peak hours, students and faculty frequently cross the roads, creating conflict points with motorized traffic and resulting in elevated pedestrian crossing risks.

Building and Infrastructure

- **High-Density Occupancy Risks:** Large-scale buildings such as Qiming Building (Library, 11,231 m²) and Sifang Building (14,351 m²) accommodate high concentrations of people. These facilities place stringent demands on the accessibility of fire evacuation routes and the integrity of firefighting equipment.
- **High-Rise Maintenance:** Densely distributed dormitory clusters, including Fengxinzi, Shanzhashu, and Ziluolan residences, require particular attention to elevator operational safety and routine maintenance of high-rise emergency evacuation facilities.

Natural and Environmental Risks

- **Forest Fire and Wind Hazards:** The campus is adjacent to large forested areas such as Lanyueling (34,071 m²) and Zhiyueling (96,042 m²). During dry seasons, there is a risk of wildfires spreading into academic and residential zones. During typhoon seasons, fallen trees pose potential threats to nearby buildings, especially dormitories located close to hillsides.

Construction Zone Risks

- **Impacts from Active Construction Sites:** Data indicate the presence of active construction sites within the campus (Construction Site, 5,370 m²). Dust and noise generated by construction activities negatively affect teaching, while the movement of heavy construction vehicles on campus roads poses safety risks to pedestrians and non-motorized traffic.

Emergency Response Considerations

- **Emergency Accessibility:** The internal campus road network (e.g., Weili Road and Weicai Road) is characterized by winding layouts. In emergency situations, it is critical to ensure that large fire engines and ambulances can quickly access residential and sports facility areas (such as Zhikuai Sports Center), avoiding delays caused by narrow roads or illegal parking.

12. Assuming an earthquake disaster occurs on the campus, please plan multiple emergency shelters, taking into account the size of the site, surrounding buildings and terrain, and their distribution. (SZU)

Answer:

Based on the provided campus geographic data, the following is an expanded evacuation shelter plan for earthquake hazards at Shenzhen University Lihu Campus:

Planning of Major Campus Evacuation Shelters

I. Zhikuai Sports Field Area (Southern Core Shelter)

- Site Advantages: Provides a large open space of 14,512 m², located away from the risk of collapse from high-rise buildings.
- Service Coverage: Primarily serves the high-density student dormitory areas in the southern part of the campus, including Fengxinzi, Shanzhashu, and Huyanglin.
- Medical Linkage: Located adjacent to Shenzhen University General Hospital, facilitating rapid transfer and treatment of severely injured individuals.
- Traffic Access: Close to Weicai Road and Weiwen Road, enabling efficient internal evacuation and access for supply and emergency vehicles.

II. Lawn Areas around Lanyueling (Northern Shelter)

- Site Advantages: Utilizes open green spaces near Lanyueling, with relatively stable geological conditions.
- Service Coverage: Primarily serves research and teaching staff in the Sifang Building and the College of Engineering Buildings (South and North Blocks).
- External Rescue Access: Adjacent to the northern campus arterial road Likang Road, serving as the preferred access route for external emergency rescue forces entering the campus.

III. Plaza in Front of Qiming Building (Library) (Eastern/Central Shelter)

- Site Advantages: Located at the geographical center of the campus, with flat terrain and high recognizability.
- Service Coverage: Covers faculty and students in the areas of Qiming Building (Library), Wenhui Auditorium, and the Academic Exchange Center.
- Assembly Function: Surrounded by a well-developed road network (such as Weixin Road), making it suitable for use as a temporary command center or information assembly point.

Safety Assurance Recommendations

- Pre-positioning of Supplies: Pre-install emergency containers at the three designated locations, stocked with first-aid kits, drinking water, and tents.
- Lifeline Protection: Ensure unobstructed access along Weiwen Road and Weixin Road, which connect the three shelters, and establish independent wireless communication systems between each site.
- Functional Zoning: Each shelter should be clearly divided into medical first-aid zones (adjacent to roads), supply distribution zones, and personnel accommodation zones to prevent secondary disorder.

13. Please assess the potential traffic safety hazards within the campus, with a particular focus on identifying congested areas and road segments that are prone to traffic accidents. (WHU)

Answer:

Based on the spatial distribution of buildings, road networks, and functional zones in the

provided dataset, here is an assessment of potential traffic safety hazards within the Information Faculty of Wuhan University. The analysis focuses on areas with high potential for "pedestrian-vehicle conflict" due to functional density (dormitories, canteens, teaching buildings) and road hierarchy.

1. High-Risk Congestion Zones (Pedestrian-Vehicle Conflict)

These areas are likely to experience severe congestion during peak hours (meal times, class intervals), leading to mixed traffic of pedestrians, e-bikes, and delivery vehicles.

- The "Life Circle" Hub (Canteen 1 & Dormitory Cluster):
 - Location: The area surrounding Information Faculty Canteen 1, Information Faculty Canteen 4, and high-density Dormitories 17 and 18.
 - Hazard Analysis: This is arguably the busiest zone. The convergence of students coming from the Library (Information Branch) and nearby dorms creates massive pedestrian flows. The presence of the Xinbu CBD (commercial area) and Supermarkets nearby adds to the chaotic movement. High risk of collisions between food delivery scooters and pedestrians, especially during lunch and dinner rushes.
- The "Commercial & Courier" Bottle-neck:
 - Location: The area around Xinghu Garden Guesthouse and the Courier Spot (Star Lake Glass Room), extending to the Shentong Express point.
 - Hazard Analysis: Courier spots (kuaidi) naturally attract delivery trucks and students stopping randomly to pick up packages. The Luoli Convenience Store and Double Gemini Selection (supermarket) increase short-stop traffic. Road blockage from parked delivery vans and sudden pedestrian movements from behind vehicles (blind spots).

2. Road Segments Prone to Accidents

- Qiushi Avenue:
 - Characteristics: This is a major artery with a length of 848 meters, connecting various parts of the campus.
 - Hazard: Long, straight road segments often encourage higher speeds for vehicles and e-bikes. It intersects with multiple residential roads like Xinghu Road and Xinghu 1st Road.
 - Risk: Speeding vehicles conflicting with pedestrians crossing at non-designated points, particularly near the intersections leading to the Teaching Experiment Building.
- Access Roads to Teaching Buildings:
 - Location: The roads surrounding No. 1 Teaching Building, No. 2 Teaching Building, and the School of Remote Sensing (No. 5 Teaching Building).
 - Hazard: These roads experience "tidal" surges of traffic. Ten minutes before class starts and ends, these segments flood with students.
 - Risk: Congestion leads to pedestrians spilling onto the roadway, forcing vehicles to weave through crowds.

3. Specific Accident-Prone Intersections & Points

- The "CBD" Intersection: The intersection near Xinbu CBD and Information Faculty Stadium. The mix of people exercising, shopping, and eating creates unpredictable traffic patterns.
- Star Lake (Xinghu) Area: The roads near Star Lake (Xinghu) and the Star Lake Pavilion. While scenic, curves near water bodies or parks can have reduced visibility.
- Laboratory Entrances: The entrance areas to the State Key Laboratory of Information Engineering in Surveying, Mapping and Remote Sensing often see administrative and research

vehicle traffic which conflict with students rushing to the nearby No. 4 Teaching Building.

14. Imagine a severe flood occurs on campus. Please develop an emergency response plan. (WHU)

Answer:

Based on the detailed geographic data of the Wuhan University Information Faculty, here is a comprehensive Emergency Response Plan for a severe flood scenario.

I. Risk Assessment & Hazard Identification

- Primary Flood Source: Star Lake. Covering an area of 3,357 m², this water body poses the immediate risk of overflowing into adjacent low-lying areas during severe rainfall.
- High-Risk Zones (Immediate Evacuation):
 - Accommodation: Star Lake Garden Guesthouse and nearby facilities like the Star Lake Staff Canteen.
 - Recreation Areas: Star Lake Sports Field and the Courier Point (Star Lake Glass Room), which are likely ground-level and adjacent to the water.

II. Evacuation & Shelter Strategy

1. Primary Assembly Points (Safe Havens) Evacuation should prioritize large, robust, multi-story structures with high capacity, located away from the immediate lake perimeter.
 - Main Shelter: Wuhan University Library (Information Branch). Reason: High capacity (3,084 m² footprint) and likely multi-story structure suitable for vertical evacuation.
 - Secondary Shelter: Information Faculty Gymnasium. Reason: Large open area (1,974 m²) suitable for setting up temporary cots and triage, though ground-floor flooding must be monitored.
 - Academic Shelter: No. 1 Teaching Building. Reason: Largest teaching facility (3,121 m²), providing ample classrooms for temporary housing.

2. Evacuation Routes

Primary Artery: Qiushi Avenue. Length: 848 meters. This is the main road spine. Emergency vehicles should keep this clear for transit between the hospital and shelters.

Avoid: Xinghu Road and Xinghu South Road should be deemed "Red Zones" until verified clear of water, due to their proximity to the lake.

III. Emergency Operations & Logistics

1. Medical Command Post

- Location: University Hospital Information Faculty Branch.
 - Protocol: If the hospital's ground floor is compromised, triage teams will relocate to the upper floors of the Library.

2. Food & Water Supply Chain

- Primary Reserve: Information Faculty Student Canteen 4. This is the largest dining facility (6,310 m²). If the building is structurally sound, it will serve as the central food distribution hub.
- Secondary Reserves: Student Canteen 1 (2,741 m²) and Student Canteen 2.
- Retail Resources: Ziqiang Supermarket, LuoJia Mountain General Store, 7-Eleven and Lawson.

15. Assuming an earthquake occurs in the area, please plan an emergency shelter for each small block. (Optics Valley)

Answer:

Based on the geographic data you provided for the Wuhan Optics Valley area, I have reclassified the building distribution and subdivided the entire area into 12 specific emergency shelter units. This refined zoning ensures that residents in each neighborhood can reach the nearest safe location within 3–5 minutes on foot, avoiding the risks associated with long-distance evacuation. The detailed planning scheme is as follows:

A. Optics Valley Square and Pedestrian Street Core Area

I. Optics Valley Square Core Unit

- Coverage Area: Optics Valley Capital Tower, Optics Valley Square Metro Station, and the surrounding Minzu Avenue intersection.
- Designated Shelter: Optics Valley Hospital
- Rationale: The only ultra-large open space in this area, far from the collapse radius of high-rise buildings, making it an absolute safety zone.

II. World City Pedestrian Street North Unit

- Coverage Area: World City · Optics Valley Pedestrian Street (Phase I/II), Huawei Smart Life Store, California Sunshine Residential Community.
- Designated Shelter: World City North Plaza (Pedestrian Street Entrance Plaza)
- Rationale: As the main entrance to the commercial street, it features a large hardened open surface, no overhead falling-object risk, and open sightlines conducive to rescue assembly.

III. Huazhong University Industry–Academia–Research Base Unit (Eastern)

- Coverage Area: Wentao Building, Weichuang Building, and surrounding research facilities.
- Designated Shelter: Internal Sports Field of the Base (Pitch/Playground)
- Rationale: University and research campuses typically include standard sports fields; grass surfaces can buffer seismic effects, and buildings are spaced far apart.

B. Residential Areas along Guanshan Avenue (Central–Northern Section)

IV. Fanyue City and Procuratorate Unit

- Coverage Area: Fanyue City Office Buildings, Hongshan District People’s Procuratorate, Optics Valley Yujia Mountain School.
- Designated Shelter: Optics Valley Yujia Mountain School Playground
- Rationale: Primary and secondary school playgrounds are legally designated shelters with complete facilities, and school buildings usually meet higher seismic standards.

V. Kunyufu and Cambridge Spring Unit

- Coverage Area: Kunyufu, Cambridge Spring Phase II, Zhongbai Warehouse, SBI Street
- Designated Shelter: Open-air Space in front of Zhongbai Warehouse
- Rationale: Open parking lots in front of large supermarkets are rare flat open spaces in dense residential areas and are far from residential buildings.

VI. Ivy Prestige Garden Unit

- Coverage Area: Ivy Prestige Garden, Wuhan Changdong Hospital, Qifa Community.
- Designated Shelter: Community Central Green Park
- Rationale: Older communities often have high building density; centralized green spaces must be used to avoid remaining in narrow alleyways.

VII. Xuguang School and Hanjingyuan Unit

- Coverage Area: Ivy Hanjingyuan (Buildings A/B), BYD Showroom.
- Designated Shelter: Wuhan Xuguang School Playground
- Rationale: The enclosed playground environment of a school facilitates management and accommodation of affected residents, with flat terrain.

C. Core Commercial and Residential Area along Guanshan Avenue (Southern Section)

VIII. Poly Times and International Center Unit

- Coverage Area: Poly International Center, Holiday Inn Express, Poly Times North Zone.
- Designated Shelter: Poly Times Kindergarten Playground in front of the International Center
- Rationale: Areas beneath high-rise office buildings are extremely dangerous; rapid relocation to low-rise kindergarten zones is required, as their playgrounds are open and free from glass curtain wall hazards.

IX. Hongfu Homeland and Fengqing Garden Unit

- Coverage Area: Hongfu Homeland, Contemporary Shuguang Jiayuan, Zisong.
- Designated Shelter: Guanshan Dutch-Style Garden (Guanshan Park)
- Rationale: This is the largest municipal park in the area, with rich vegetation and vast space capable of accommodating thousands of people, making it the most ideal long-term shelter.

X. Optics Valley New World and K11 Unit

- Coverage Area: Optics Valley New World (T1/T2), K11 Select, Guanshan Village.
- Designated Shelter: Green Space east of New World T1 or Plaza around K11
- Rationale: In ultra-high-rise clusters (T1 height exceeding 200 meters), shelters must be open plazas located at least 50 meters away from buildings to prevent falling glass hazards.

XI. Poly Garden and SBI Unit

- Coverage Area: Poly Garden, SBI Entrepreneurship Street, Changhang Blue Crystal International.
- Designated Shelter: Central Tennis Court / Sports Field of Poly Garden
- Rationale: Large, mature residential communities are typically equipped with central sports facilities, allowing residents to reach shelters immediately after exiting buildings.

XII. Vanke Center and Guanshan Middle School Unit

- Coverage Area: Optics Valley Vanke Center, Jintai Hotel, Sunshine · Shangdong.
- Designated Shelter: Guanshan Middle School Stadium
- Rationale: Guanshan Middle School has a standard 400-meter track stadium with extremely large capacity, suitable as the main assembly point for this sub-area.

Summary Recommendation: In high-density urban areas such as Optics Valley, school playgrounds and municipal parks are the preferred shelters (e.g., Dutch-Style Garden, Yujia Mountain School), as they naturally provide buffer zones. In commercial districts (e.g., K11, World City), open-air plazas are the only viable refuge; however, constant vigilance is required to avoid standing directly beneath glass curtain walls.