A Research on the Evaluation of the Impact of New Buildings on the Environment

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Abstract. With the acceleration of China's urbanization process, environmental pollution caused by new buildings has aroused concern. This article starts research from the perspective of the environmental impact of new buildings. Through research and analysis of air quality, water and noise factors in actual cases, the impact of new buildings on the environment during construction and operation periods is compared. Through data analysis, it is found that air quality, noise, and solid waste have a greater impact on the environment during the construction period. After operation, it is mainly water and noise that have a greater impact on the environment.

1. Introduction
At present, China's rapid social, economic development and construction projects are emerging in an endless stream. However, in the construction period of the construction project and after the production and operation, there are environmental impact problems to varying degrees. Therefore, the environmental impact assessment of construction projects is of great significance for achieving environmental, economic and social sustainable development. The environmental impact assessment of construction projects mainly focuses on water environment, atmospheric environment, sound environment, soil environment, ecological environment and environmental risk. In this context, how to help construction projects better develop towards the direction of green, energy saving and environmental protection through environmental impact assessment and become the focus of people's attention.

2. Impact of construction projects on the living environment
The main contents of the environmental impact assessment of the construction project mainly include: the geographical location, topography, landform, soil and soil quality of the project[1]; the water system and hydrological status of the area, the climate profile; the local environmental quality of water, sound, atmosphere and soil; the actual functional environment of the development area[2]. The environmental impact assessment of construction projects is mainly carried out in accordance with environmental factors: water environment, acoustic environment, ecological environment and atmospheric environment[3]. It is especially important to analyze the impact of the external environment on residents in the environmental impact assessment of construction projects[4-5]. According to the statistics of residents' environmental complaints, the environmental factors affecting the quality of life of residents are atmospheric, noise and solid waste[6].
3. Research methods
This article takes the construction project of Xingjing Town as an example to analyze the factors affecting the environment. Combining the field investigation method and the experimental investigation method, the evaluation obtained from the above analysis is summarized. According to the actual situation of the project, the comparative method is used to analyze the environmental impact of the new building before construction, and during the construction phase.

3.1. Site survey.
Before the project construction and project construction phase field investigation to understand the surrounding environment, mainly including the construction process, operation records, environmental protection measures, the impact on the residents.

3.2. Data collection.
According to the construction process of the surrounding environment, the data of air, noise and solid waste at sensitive points around the area are measured. And data is collected through monitoring reports.

4. Research results

4.1. Research field
The project is located in Xingjing Town, Xixia District, Yinchuan City, Ningxia Hui Autonomous Region. The terrain is open and flat, with the terrain high in the south and low in the north. The meteorological data used comes from Yinchuan Weather Station. The meteorological data of Yinchuan Meteorological Station (geographical coordinates: 38°29′N, 106°13′E) from 1971 to 2020 are shown in Table 1. The project mainly constructs resettlement houses and community service houses, property management houses, garbage transfer stations, tourist reception centers, day care centers and health centers. And supporting the construction of water supply and drainage, fire fighting, electrical, heating pipe network and road greening projects. The total area of the project is 26,3310.15 m², and the total construction area is 165,823.49 m².

| Annual average air pressure | Annual average temperature | Annual extreme minimum temperature | Annual extreme maximum temperature | Annual average relative humidity | Annual precipitation | Annual evaporation | Annual maximum wind direction | Annual average wind speed | Annual sandstorm days | Annual maximum wind speed | Annual strong wind days | Annual maximum frozen soil depth | Annual maximum snow depth |
|-----------------------------|----------------------------|-----------------------------------|-----------------------------------|---------------------------------|------------------------|-------------------|---------------------------|------------------------|----------------------|------------------------|------------------------|--------------------------|--------------------------|
| 890.9hPa                    | 9.0℃                       | -27.7℃                            | 38.7℃                             | 57%                             | 186.3mm                | 1593.1mm          | N(9%)                     | 2.1m/s                 | 5.2d                 | 28.0m/s                | 18.5d                  | 88cm                     | 9cm                      |

4.1.1. A subsubsection. The paragraph text follows on from the subsubsection heading but should not be in italic.

4.2. Environmental status before the new project

4.2.1. Air quality status. This evaluation uses the monitoring data of Yinchuan City by the Yinchuan Environmental Monitoring Station. The monitoring items are PM10, PM2.5, SO2, NO2. See Table 2 for specific monitoring data.
Table 2 List of monitoring locations for current ambient air quality status  Unit: mg/m³

| Monitoring point | Monitoring items | Monitoring time | Mean concentration | Max | Minim | Compliance rate (%) | Standard Value |
|------------------|------------------|-----------------|-------------------|-----|-------|---------------------|---------------|
| Yinchuan City    | SO₂              | First quarter   | 128               | 275 | 28    | 76.7                |               |
|                  |                  | Second quarter  | 22                | 45  | 3     | 100                 | 150           |
|                  |                  | Third quarter   | 17                | 49  | 3     | 100                 |               |
|                  |                  | Fourth quarter  | 108               | 297 | 8     | 77.2                |               |
|                  |                  | Annual          | 69                | 297 | 3     | 88.5                | 60            |
|                  | NO₂              | First quarter   | 50                | 101 | 17    | 94.4                |               |
|                  |                  | Second quarter  | 32                | 66  | 7     | 100                 | 80            |
|                  |                  | Third quarter   | 35                | 64  | 15    | 100                 |               |
|                  |                  | Fourth quarter  | 53                | 100 | 16    | 94.6                |               |
|                  |                  | Annual          | 42                | 101 | 7     | 97.3                | 40            |
|                  | PM₅₀             | First quarter   | 137               | 552 | 34    | 72.2                |               |
|                  |                  | Second quarter  | 111               | 932 | 40    | 88.4                | 150           |
|                  |                  | Third quarter   | 81                | 136 | 38    | 100                 |               |
|                  |                  | Fourth quarter  | 117               | 229 | 31    | 77.2                |               |
|                  |                  | Annual          | 112               | 932 | 31    | 88.4                | 70            |
|                  | PM₂.₅            | First quarter   | 67                | 140 | 24    | 67.8                |               |
|                  |                  | Second quarter  | 38                | 176 | 14    | 97.8                | 75            |
|                  |                  | Third quarter   | 41                | 73  | 14    | 100                 |               |
|                  |                  | Fourth quarter  | 65                | 141 | 18    | 67.4                |               |
|                  |                  | Annual          | 53                | 176 | 14    | 83.3                | 35            |

4.2.2. Surface water quality status. The surface water body in the area where the project is located is mainly Siergangou. See Table 3 for the monitoring results of the status quo of surface water.

Table 3 Surface water monitoring and evaluation results of Siergangou

| Monitoring waters | Monitoring waters | Monitoring waters | Monitoring waters | Monitoring waters | Monitoring waters | Monitoring waters |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| pH                | 8.20              | 7.22              | 7.91              | -                 | 0                 | 6–9               |
| DO                | 10.2              | 3.7               | 6.3               | -                 | 0                 | 2                 |
| Permanganate Index| 10.4              | 2.3               | 6.0               | -                 | 0                 | 15                |
| BOD₅              | 10.1              | 3.2               | 5.9               | 0.01              | 8.3               | 10                |
| COD               | 38.0              | 12                | 21.7              | -                 | 0                 | 40                |
| NH₃-N             | 20.0              | 0.36              | 6.07              | 9.0               | 83.3              | 2.0               |
| Petro             | 0.05              | 0.01              | 0.02              | -                 | 0                 | 1.0               |
| Total phosphorus  | 1.560             | 0.103             | 0.506             | 2.9               | 50.0              | 0.4               |

4.2.3. Current status of acoustic environment quality. In order to understand the current status of the acoustic environment quality around the project, this assessment will monitor the current status of the acoustic environment quality around the plant boundary of the project from April 19th to 20th, 2020. According to the current situation of the surrounding environment on site survey, 1 monitoring point is set up 1m outside the boundary of each plant in the project area, a total of 4 monitoring points. This monitoring will be carried out on April 19-20, 2020, to monitor the current status of the acoustic
environment quality, continuously monitoring for 2 days, monitoring twice a day, once a day and night. The environmental noise monitoring results are shown in Table 4.

| Monitoring point | Monitoring value | Standard value | Evaluation results | Monitoring value | Standard value | Evaluation results |
|------------------|------------------|----------------|--------------------|------------------|----------------|--------------------|
| 1#               | 43.5 42.7        | 60             | Standard           | 39.5 38.7        | Standard       | 50                 |
| 2#               | 44.1 43.2        |                | Standard           | 39.5 40.1        | Standard       |                    |
| 3#               | 41.8 42.7        |                | Standard           | 37.9 38.4        | Standard       |                    |
| 4#               | 43.5 42.8        |                | Standard           | 39.8 38.1        | Standard       |                    |

4.3. Environmental impact analysis during construction period

During the construction of this project, various construction activities will have a certain impact on the surrounding environment. It mainly includes the impact of waste gas, waste water, noise, solid waste, etc. on the surrounding environment, and the dust and construction noise are particularly obvious. Air pollutants mainly come from construction dust, and secondly, SO2, NO2, CO, hydrocarbons and other pollutants emitted by construction vehicles, construction machinery and other fuel machinery and decoration waste gas.

4.3.1. Atmospheric environmental impact analysis. The main sources are: dust from demolition and construction machinery; dust from stacking construction materials; dust from transportation. Construction dust is the dust caused by demolition and cleaning of working face. During the construction process, the majority of construction machinery and transportation vehicles are diesel engines. Decoration waste gas is not only related to the types of construction materials such as adhesives, paints, and paints used, but also related to the content of organic solvents in the adhesives, paints, and paints. The amount of waste generated is difficult to estimate and belongs to unorganized emissions.

4.3.2. Water environment impact analysis. The sewage discharge during the construction period mainly comes from the domestic sewage of the constructors and construction waste water. The domestic sewage volume of the construction workers is 5760m3, and the main pollutants are COD Cr, SS, BOD5, etc. During the construction period, dry toilets will be set up in the project area, the toilet water will be splashed to suppress dust, and the toilet waste water will be composted back to the field. The construction waste water is mainly concrete curing waste water and equipment and tool cleaning water, etc. The production volume is 3.6m3/d, mainly containing SS and petroleum, etc. The waste water is reused after being settled in the sedimentation tank.

4.3.3. Analysis of acoustic environmental impact. The noise during the construction period mainly comes from demolished buildings, civil engineering noise and transportation vehicle traffic noise. After the noise generated during the construction period is attenuated by measures such as distance attenuation and simple enclosure, the noise at the boundary of the construction site meets the standards of the "Environmental Noise Emission Standard for the Boundary of Construction Sites" (GB12523-2011). To prevent and control the environmental impact of construction noise, one is to strengthen management and strictly stipulate the construction time of all kinds of machinery with severe noise interference; the other is to improve construction methods and arrange operations that must generate strong noise in insensitive periods. After the implementation of the above measures, the noise at the boundary of the construction site can meet the standard limit of 70dB(A) at daytime and 55dB(A) at night in the "Environmental Noise Emission Standard for Construction Sites" (GB12523-2011).
4.3.4. Environmental impact analysis of solid waste. The solid waste during the construction period of this project mainly includes demolition waste, construction waste and domestic waste. Demolition garbage and construction garbage are similar in nature, and they are all transported to designated municipalities for storage, and domestic garbage is collected and transported uniformly by the environmental sanitation department. Solid waste has a small direct impact on the surrounding water environment and atmospheric environment, and mainly affects the quality of the construction site and the environmental landscape around the site.

5. Conclusion

According to the monitoring data, it can be known that the first, second and fourth quarter monitoring values of pollutants PM10 and PM2.5 and the annual average monitoring values exceed the requirements of the second-level standard. The reason for exceeding the standard is climatic factors, and the regional wind and sand are relatively large. In the third quarter, due to the abundant rain, the particulate matter in the air settled with the rain, so there was no phenomenon of exceeding the standard. Part of the monitoring values of NO2 and SO2 in the first and fourth quarters and the annual average monitoring values exceeded the requirements of the secondary standard. The reason for exceeding the standard is that the first and fourth quarters are heating seasons and the pollution from coal-fired heating boilers in the urban area is caused. In the second and third seasons, the daily average concentration of NO2 and SO2 meets the requirements of the secondary standard. It can be seen that after measures are taken, the waste gas generated during the construction period of the project will have a certain impact on the surrounding environment. With the end of the construction period, the environmental pollution caused by the waste gas generated during the construction period also disappeared.

The construction of the project conforms to the national industrial policy and the requirements of the plan. After effective and reasonable treatment of the generated pollutants, the discharge of each pollutant meets the requirements of up to standard discharge and will not have a significant impact on the surrounding environment.

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