



# MPOWER: Designing Restorative Open Spaces in a Manufacturing Economic Zone to Support Workers' Well-being

## ABSTRACT

One of the major factors contributing to the global health crisis is stress in which the workplace environment is identified as one of the possible causes of stress or avenues for restoration since studies suggest that the quality of the physical working environment can either improve or worsen the health and well-being of the workers depending on its supportiveness. Since exposure to the monotonous, lifeless, and standardized appearance of industrial areas has been identified as a contributing factor to the stress experienced by the workers, this study aims to highlight the significance of the outdoor environment in influencing the health and well-being of the industrial workers, by exploring the open spaces of an active industrial complex.

Key findings from the study show that majority of the respondents are moderately stressed. The open spaces provide some level of support but there is still room for improvement to help alleviate stress. When assessed against employee preference, some gaps have been highlighted that need to be addressed accordingly. A general guideline which is primarily patterned after environmental theories about health and well-being (SRT, ART, SDT, Sustainable landscape design) and work-related concepts (Effort-recovery model and General Adaptation Syndrome) has been conceptualized which can be followed for other industrial areas. In brief, the results of this study suggest that the open spaces in industrial areas are currently not supportive enough to the well-being of the workers and can still be further improved with the prioritization on visual, noise, air pollution buffers, adaptive safe spaces, low to light-intensity activities and multi-sensory environments based on their needs and preferences.

## STRESS IN THE WORK ENVIRONMENT



Despite the high contribution of the manufacturing industry to the country's economic growth, workers in such industry are one of the most stressed people because of the heavy work demands, low ranking, and under-compensation (Serrano, 2019). Moreover, one of the identified stressors which reportedly affect the health of the workers is the condition of the physical environment.



Common Situation around Manufacturing Facilities / Industrial Park

## GOAL OF THE STUDY

With the rising health crises in the industrial sector, this study aims to support the well-being of workers in industrial parks by assessing their relationship with the open spaces and providing landscape design guidelines based on their needs and preferences in using these spaces.

The **outer ring** comprises the main data sources which are:



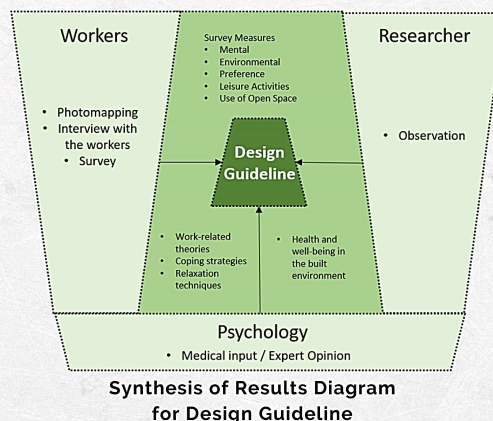
1) photomapping, interviews, and surveys with the workers



2) observation from the point of view of the researcher



3) expert opinion from a licensed doctor in psychiatry.



The **middle ring** consists of the intersecting concepts between the data sources that were used for the data collection. This consisted of the survey measures, work-related concepts and theories, and architectural techniques with a scientific foundation in the field of psychology.

The **innermost** part of the diagram or the core is the design guideline which is based on the key inputs from various perspectives.

The synthesis diagram visualizes the weight of the data sources (workers, psychology, and the researcher), the concepts involved in the data collection, and the output generated based on the inputs.

## THE STUDY SITE

### Victoria Wave Special Economic Zone



### Site Selection

The Victoria Wave Special Economic Zone is an industrial complex located in Malaria, Caloocan City.

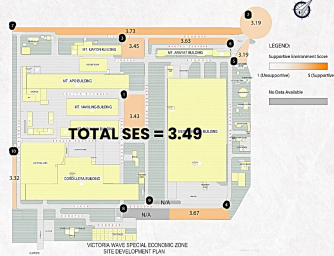
The site was chosen because of the following reasons:

- First**, in contrast with the other manufacturing economic zones in NCR, VWSEZ is the only of its kind that offers spaces for various manufacturing industries.
- Second**, although fully developed, it is equipped with available open spaces with lush green surroundings that can still be designed to be more supportive to the workers.
- Third**, the size of the economic zone is feasible enough to be explored.
- Fourth**, it is the most accessible site for the researcher in terms of location and cooperation of the administration.



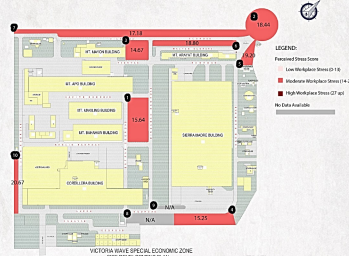
# ANALYSIS

## Supportive Environment Scoring (SES) of the Most Utilized Open Spaces (Top 1)



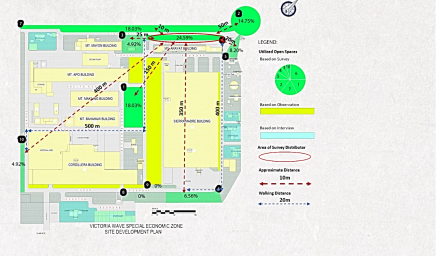
The Overall Supportive Environment Score of the most frequently used spaces by the workers ranged from 3.19 up to 3.73 wherein the overall average among these spaces is 3.49 which is closer to neutral supportiveness. This suggests that the spaces can still be improved to make them more supportive to the workers.

## Average Stress Score by Open Space Usage



An assessment of the average stress levels in the top 3 open spaces identified by the respondent showed that employees who use the space beside the canteen have the lowest stress score while those taking their breaks in front of the administration office have higher stress.

## Usage of Open Spaces vs Distance Travelled



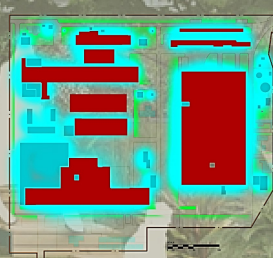
In a single minute, 80 meters can be covered through walking and 300 meters can be covered through biking. In analyzing the usage of open spaces during break time, those open spaces which are 350 – 450 meters away from the hotspot of users are less frequented due to their farther distance which is 5-minute away. Hence, the farther the open space is, the less chance it would be frequented by the workers.

# DESIGN GUIDELINES

## Sense of Control

- Safety from the industry
  - Noise mitigation from industrial noise
  - Designated trash bins (Clean-as-you-go)
- Psychological Detachment
  - Buffering of open spaces from the workplace
  - Freedom to choose activities (5-minute walk proximity)

VISUAL BUFFERING MAP OF OPEN SPACES IN VWSEZ



NOISE BUFFERING MAP OF OPEN SPACES IN VWSEZ



## Leisure Activities

- Outdoor Furniture for Stationary Activities
  - Walking and stretching
  - Pedestrian path
  - Specialized equipment/amenities for relaxation (e.g. reflexology path, walk and stretching equipment)
- Active Sports & Activities
  - Multi-purpose activity areas

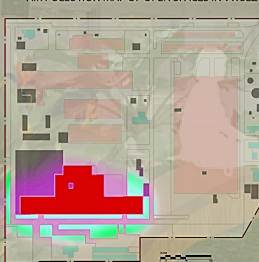
## Social Support

- Safety and Security from other people
  - Adapting to the pandemic situation
- Socialization
  - Choice of social activity (isolation, with few / many friends)



- Social distancing cannot be forced upon the workers, but they could be guided through an adaptive design of outdoor seating areas e.g. provision of marking on the grass to designated spaces, and purposive design of outdoor seating furniture.
- In dealing with stress, people have different preferences for social activities. Applying that same concept to the design of open spaces in the workplace, social gathering areas should be able to accompany various social activities.

AIR POLLUTION MAP OF OPEN SPACES IN VWSEZ



## Positive Distractions

- Organic Design
- Shaded Structures
- Art Pieces and Creative Spaces
- Buffering and Cushioning from Air Pollution

# DESIGN VISUALIZATION

