

## Development of a Shuttle Service Plan for Zamboanga City, Philippines

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**Abstract:** Zamboanga City is a highly urbanized city in the southern Philippines with the sixth highest population and third largest land area for a city in the country. It is currently formulating a comprehensive transportation and traffic management plan that covers, among others, public transportation. The current public transportation system is being rationalized using principles set under the Philippine government's program that seeks to have Local Public Transport Route Plan (LPTRP) in place for all cities and municipalities. This paper presents on the development of a shuttle system for Zamboanga City in the context of LPTRP, eliminating the complex but chaotic public transportation comprised of jeepney routes. By introducing the shuttle system with a higher capacity vehicle, it hopes to promote a more efficient public transport that will combine with active transport such as biking, and realizing the pedestrianization plan of the city for its CBD.

*Keywords:* Shuttle service, Local Transport Plan, CBD

### 1. Introduction

#### 1.1 Background

Zamboanga City is a highly urbanized city located in western part of Mindanao island in the southern Philippines. It's population in 2015 was 861,799, and is the sixth most populous city with the third largest land area in the country. It is an important economic hub in the Zamboanga Peninsula and the island provinces of Basilan, Sulu and Tawi-Tawi, which are to its southwest. The total combined population within this region is close to 2.5 million people thus, and travels within the city and between the contiguous economic centers are hectic.

A sustainable transportation system in Zamboanga City would ensure adherence to the highest standards of safety, security, economic efficiency and respect for the environment in all levels of transport management. While the contribution of high occupancy vehicles is a way towards achieving a sustainable transport system while reducing dependency on private car travels however, the growth of public utility jeepneys and/or busses remain stagnant.

A Master Development Plan of Zamboanga City was formulated in the 1990s for the period 1997 to 2012 (Zamboanga City, 2003) that recommended pedestrianization of the city core or the central business district and its recommended consideration of a smaller area of a pedestrianization first as a pilot project with possible expansion to cover a larger area of the old city if successful, the idea of a short-haul and shuttle transit system becomes imperative. As previously shown and again here in Figure 1 shows the map of the central business district showing the two phases of

pedestrianization zone, rerouting of public transport such as public utility jeepneys and , tricycles, installation of two parking areas/buildings (located in the old city market and northern boundary of pedestrian zone) and two pedestrian overpasses.



Figure 1. Proposed Pedestrianization of the Central Business District of Zamboanga City  
Source: Master Development Plan, Zamboanga City, 1997 to 2012 (2003)

The Local Public Transport Route Plan or LPTRP (Zamboanga City, 2019) is a plan detailing the route network, mode, and required number of units per mode for delivering public land transport services (current and projected). It is envisioned to serve as a decision-support document for developing the Comprehensive Local Transport Plan.

With the city government’s initiative, idea and proposal to provide a shuttle service within the central business district (CBD) that will accompany its plan for pedestrianization for the CBD, this shuttle service plan was borne out to complement the successful realization of an urban sustainable transport system in the City of Zamboanga.

## 1.2 Objectives

This plan was developed as part of a more comprehensive Transportation and Traffic Management Plan (TTMP) study for the City of Zamboanga. The objectives of this study on the shuttle service are the following:

- a. Collect pertinent data on shuttle service;
- b. Assess opportunities for shuttle service for the city particularly in the city center and its corresponding route plan; and
- c. Formulate recommendations for shuttle service over the immediate, short, medium and long term periods.

## **2. Concepts and Principles**

### **2.1 Short-Haul and Shuttle Transit Systems**

The central business districts (CBDs) of medium-sized and large cities, suburban centers, university campuses, airport complexes, fair and exhibition grounds, and similar major activity centers (MACs) generate large volumes of short trips within their areas, which are usually rather small (0.5 to 3.0 km in diameter). Most of these trips are best performed by walking. However for trips longer than 400 to 800 m (a 5- to 10-min walk), it is often desirable to provide a transportation service to reduce the time and increase the comfort of movement. Transit systems for these short trips, which usually operates as lines of 1 to 3 km in length, are referred to as short-haul transit systems (Vuchic, 2007). For example, such services are provided in the CBDs of many cities by buses, streetcars, Automated People Mover (APM) systems (Miami, Detroit), or other modes.

Because of the short trip lengths, passengers require that the service be frequent: long waiting is not acceptable. Speed, on the other hand, is not very important, since high speed can usually reduce travel times on such short distances by only a few minutes. Capacity requirements vary but may often be rather high because of sharp peaking of demand.

### **2.2 Pedestrians**

Walking is and will remain the basic mode of travel for short trips. It is always “instantly available,” involves no terminal times (which make the automobile and some transit mode unsuitable for this application), and has extremely high capacity (5,000 to 6,000 persons per meter of walkway width per hour in transportation corridors; on a street sidewalk, with less orderly two-way movement, the corresponding values are 2,500 to 3,000 prs/m/h). The limitations of walking are discomfort and low speed (3.8 to 5.0 km/h). Discomfort is often caused by the unpleasant environment; dangerous street crossings, air pollution from auto traffic, congested narrow sidewalks, no weather protection and steep grades (Vuchic, 2007).

Careful planning and designs of street, including weather protection, sitting areas, escalators, and the provision of integrated pedestrian walkway networks on regular streets, pedestrian street, enclosed passageways, and malls can not only eliminate unpleasant features but also create a human-oriented urban environment that is pleasant and attractive for walking. This is particularly the case in CBDs. Recent recognition of the importance of such an environment for the vitality and economic health of the entire city has caused a radical change in transportation policies in many cities, particularly in western and central Europe. Efforts to maximize the vehicular capacity of every street have been replaced by efforts to separate vehicular from pedestrian flows and create exclusive pedestrian flows and create exclusive pedestrian zones or extensive networks of walkways (Belgrade, Munich, Portland, and Rotterdam).

The other limitations of walking, its low speed, can be solved by mechanical means. The range of technologies serving this purpose can be classified in four major categories. One category, continuously moving systems, assists pedestrians. The other three are various modes of vehicular technologies. One of these are the short-haul transit modes like the shuttle service.

### **2.3 Short-Haul Transit Modes: Regular transit services**

Regular transit services, which are often supplemented by special shuttle or loop lines. Among its typical examples are bus “shopper specials” and “cultural loops”; the CBD streetcar in Tacoma, Washington; subway “shuttle lines,” such as the Times Square-Grand Central Terminal Subway Shuttle in New York; and Waterloo and City Line in London are examples. The conditions for successful deployment of transit for short-haul travel are that it offers high frequency of service, preferably a dense network with adequate information for passengers, and low fares. In large cities, these requirements usually necessitate vehicle designs that allow rapid boarding/alighting (high ratio of doors to vehicle capacity) to avoid excessive delays to through passengers, rapid-fare collection methods, and graduated fare structure.

## **2.4 Significance of Short-Haul Transportation**

The impacts and importance of short-haul transportation, particularly for CBDs, are often underestimated. In many cities, immediate short-haul service represents a major deterrent to transit use and creates pressures for provision of extensive parking in the immediate vicinities of all major buildings. This, in turn, results in auto-oriented environments that discourage walking and destroy the unity of the entire center-city areas. If, on the other hand, CBDs and other MACs are designed in unified areas with ubiquitous mobility (i.e., easy travel among all points within them), these centers can be extremely efficient for conducting businesses as well as attractive for work, shopping, recreation, other activities or just strolling. Such ubiquitous mobility can be achieved only by careful planning and deployment of various short-haul transportation services, ranging from attractive pedestrian streets to transit lines. These systems must be closely coordinated with regular transit services in the area and parking facilities located, preferably, along its periphery. Short-haul transportation can thus be a significant element in designing central cities that provide all the unique elements for urban activities in a human-oriented environment.

Recognizing the importance of good short-haul transportation for the economic and environmental vitality of MACs, city government or private businesses often provide special funds to support low-fare or free short-haul services. The rationale for financial support from sources other than fares is that it is neither practical nor agreeable to the public to pay significant fares for short trips in an area, whether they be vertical (elevators) or horizontal (short-haul). A good example of free services are the fare-free zones in Portland and several other cities. A common arrangement is that fare collection in all transit lines in the city is done upon entering for inbound trips and prior to exiting for outbound trips. The CBD is then a zone in which there is no fare collection at all, so that trips within that area are free. Weekly and monthly transit passes with unlimited travel on certain lines or throughout the city, which are used extensively in many European cities, can also provide “free” short-haul travel.

## **2.5 Context for the Proposed Shuttle Service**

The proposed shuttle service follows the initiatives of the national government for public transport modernization and rationalization. The Philippines’ Department of Transportation issued Department Order No. 2017-011: Omnibus Guidelines on the Planning and Identification of Public Road Transportation Services and Franchise Issuance. Better known as the Public Utility Vehicle Modernization Program (PUVMP), this is a flagship program of the government that “envision[s] a restructured, modern, well-managed and environmentally sustainable transport sector where

drivers and operators have stable, sufficient and dignified livelihoods while commuters get to their destinations quickly, safely and comfortably.”

The DOTr and the Land Transportation Franchising and Regulatory Board (LTFRB) also released a manual (DOTr, DILG and LTFRB, 2017) to guide cities and municipalities in rationalizing road public transport routes. All cities and municipalities were enjoined by the national government to formulate and submit for approval their Local Public Transport Route Plan (LPTRP). The City of Zamboanga complied with this and produced their LPTRP, which was approved in 2019. The plan included a proposed shuttle system that will not be operating in mixed traffic but along selected roads within the similarly proposed pedestrianized zones of the CBD as shown previously in Figure 1.

Related to the pedestrianization plan and shuttle service plan are the proposed parking areas and buildings in the CBD. These are shown in Figure 2 where existing parking buildings are indicated, and four locations for major parking areas in the periphery of the pedestrianized zones are also shown. This shows consistency and the integration of transport plans for the CBD as envisioned by the city.



Figure 2. Proposed locations of parking areas/buildings in the CBD.

The proposed shuttle service will not operate in mixed traffic but will provide transport for the longer distance trips within the CBD. Not all people will opt to walk or cycle. And those taking cars and will park in the periphery of the pedestrianized zones may need to take the shuttle instead. The shuttle service route connects with the regular public transport services along rationalized jeepney and tricycle routes from the west, north and east corridors of the city. The combination of walking, cycling and the shuttle service provides many options for people and enhance their mobility in the area.

### **3. Assessment**

#### **3.1 Considerations and Data**

The following considerations, as per consultation with the local government unit, for assessment of road sections for shuttle service plan were used in determining the route. These are the following:

- a. To accommodate those who will have a difficulty to transfer from point to point within the Central Business District (CBD, town proper) once it becomes pedestrianized;
- b. The intended route will be within the CBD that will operate in a loop;
- c. It is not intended to replace other modes of transportation but instead run alongside existing ones;
- d. The primary intended passengers are the person with disabilities, pregnant women, senior citizens, people carrying baggage and the likes, who will be affected by the pedestrianization;
- e. It will operate once implemented with an initial three (3) units of minibus type of mode; and
- f. It will be operated by the Zamboanga City local government unit.

The abovementioned considerations were used alongside with the government-approved Local Public Transportation Route Plan (LPTRP) in order to determine the shuttle service route plan within the CBD.

The study mapped the old public transport routes in the city (i.e., before the pandemic) as well as the proposed rationalized routes in the LPTRP. The pre-pandemic routes for the city are shown in Figures 3, 4 and 5, respectively. The rationalized routes for the CBD are shown in Figure 6.

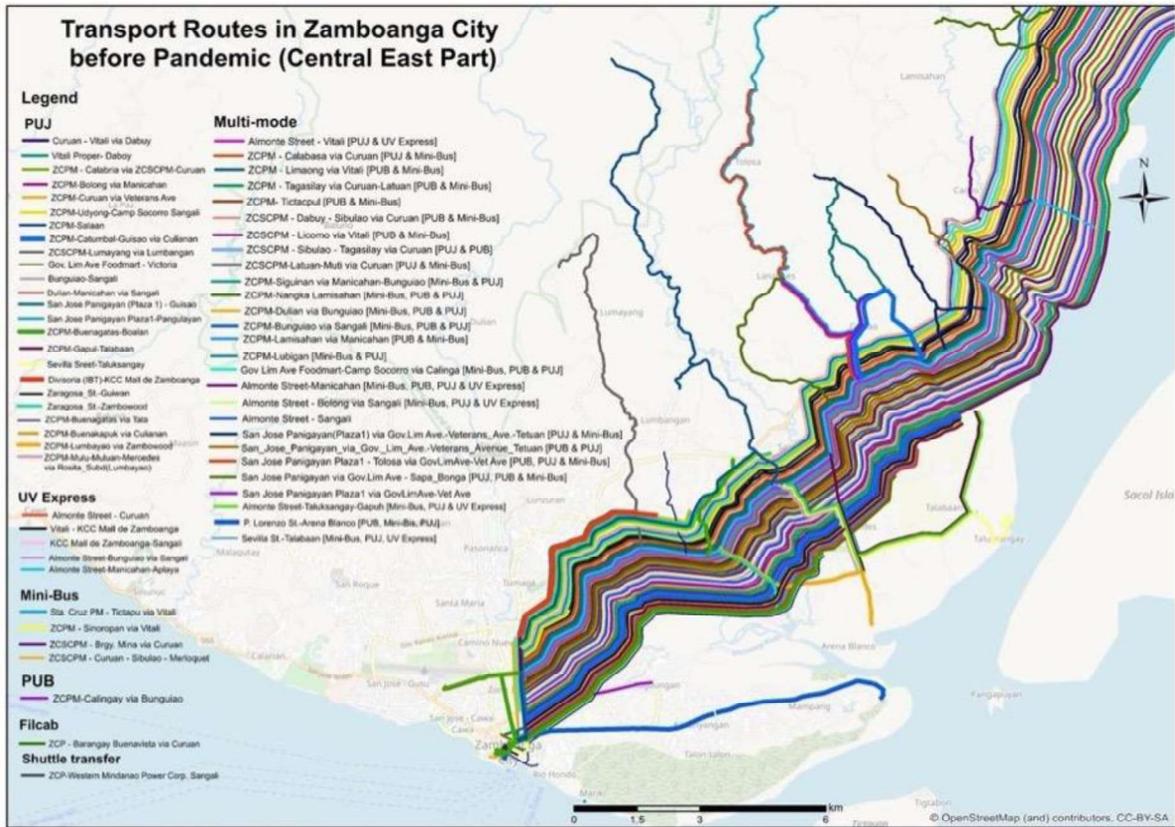


Figure 3. Pre-pandemic public transport routes in Zamboanga City leading to the CBD - East

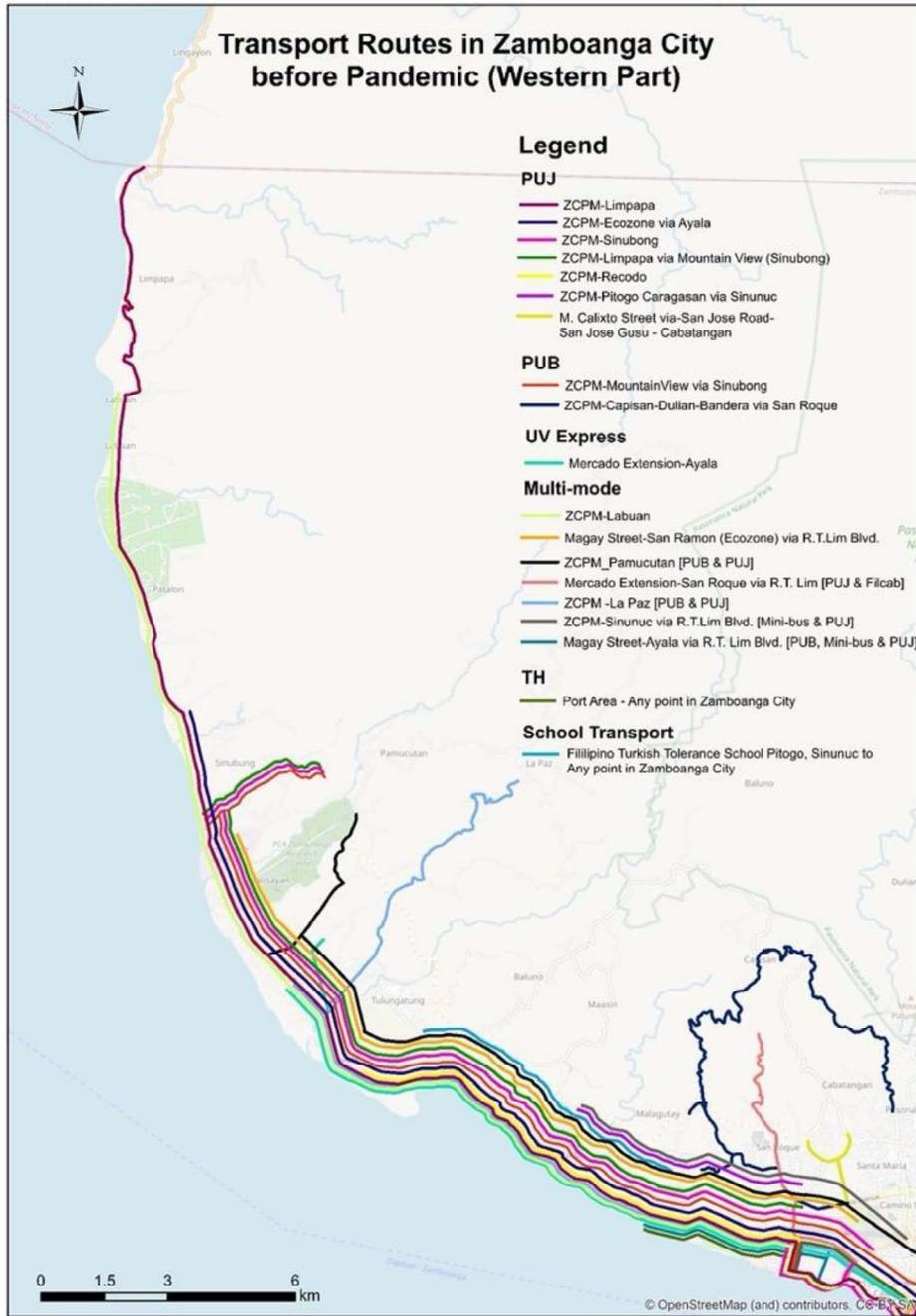


Figure 4. Pre-pandemic public transport routes in Zamboanga City leading to the CBD - West

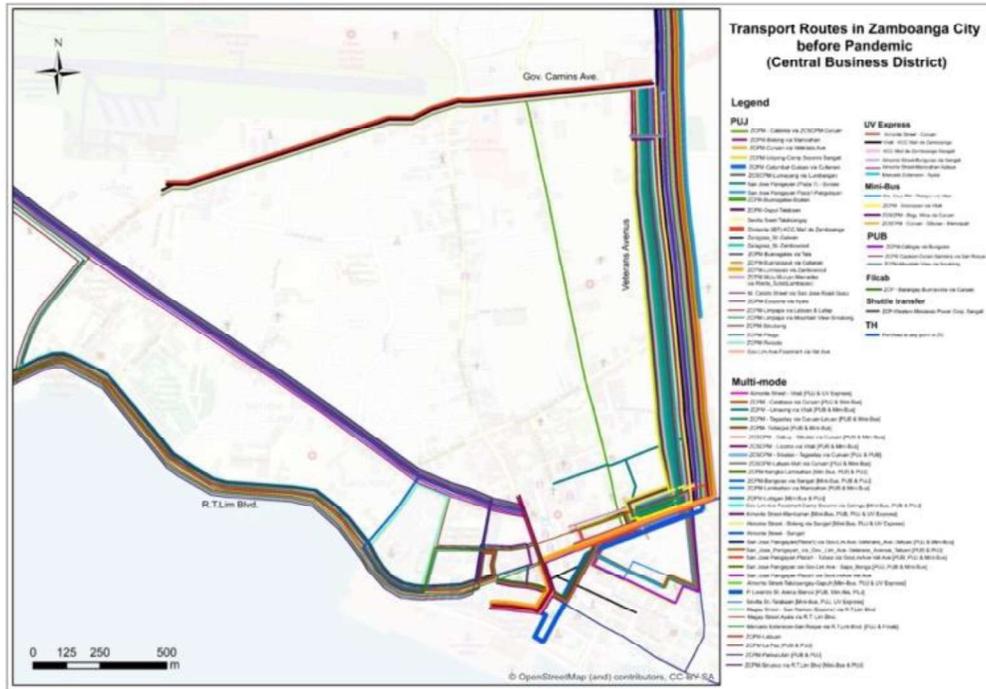


Figure 5. Pre-pandemic public transport routes in Zamboanga City CBD



Figure 6. Simplified (rationalized) public transport routes in Zamboanga City CBD

An OD Survey was also conducted for the city under the bigger transport study being implemented for the city. Figure 7 shows the desire lines map for trips in the central part of the city that includes the CBD. The data from these studies were used to develop the propose shuttle route.

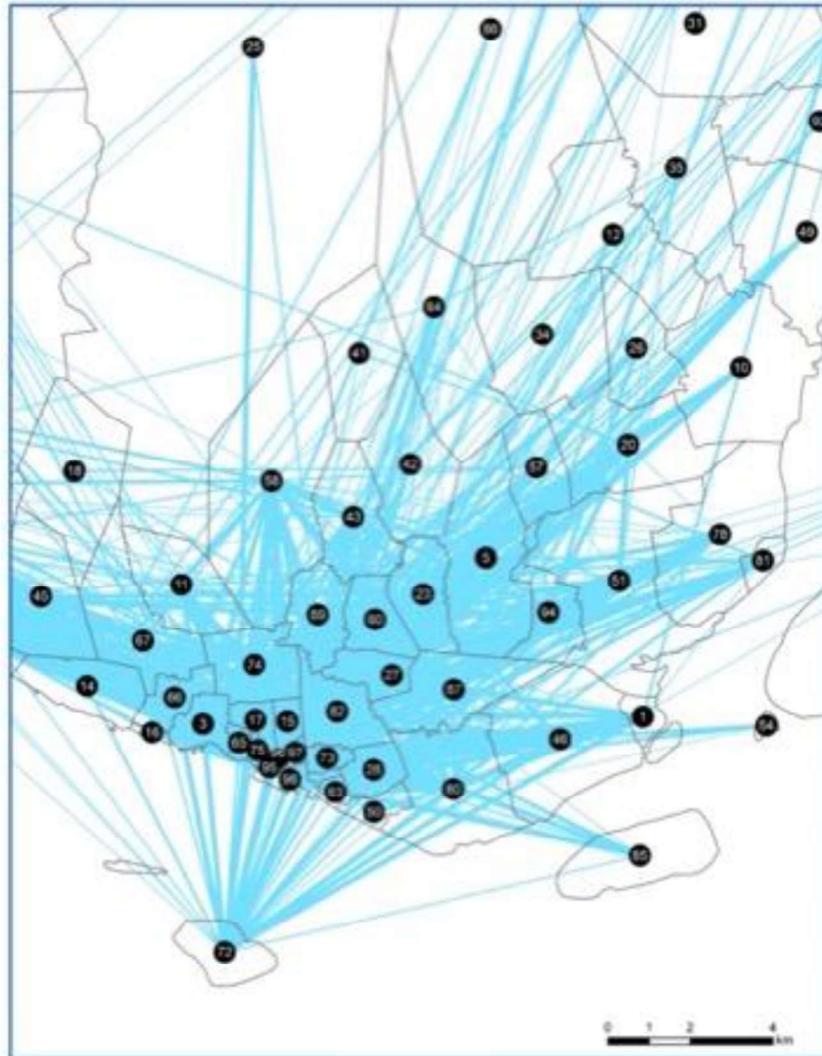


Figure 7. Desire lines map for public transport trips in central Zamboanga City.

### 3.2 Proposed route

The proposed shuttle service route plan is shown in Figure 8 alongside with the recommended streets for pedestrianization. The proposed route will be as follows: N.S. Valderosa Avenue, right to Lustre, right going around Fort Pilar, left to N.S. Valderosa Avenue, right to Veterans Avenue, left to Campaner, left to Forest, right to Tomas Claudio, left to La Purisima, right to Gov. Lim Avenue, right to Alejo Alvarez Street, right to Ledesma Road, right Mayor Climaco Avenue, left to J.S. Alano Street, and connect back to N.S. Valderosa Avenue. The total route length of the loop



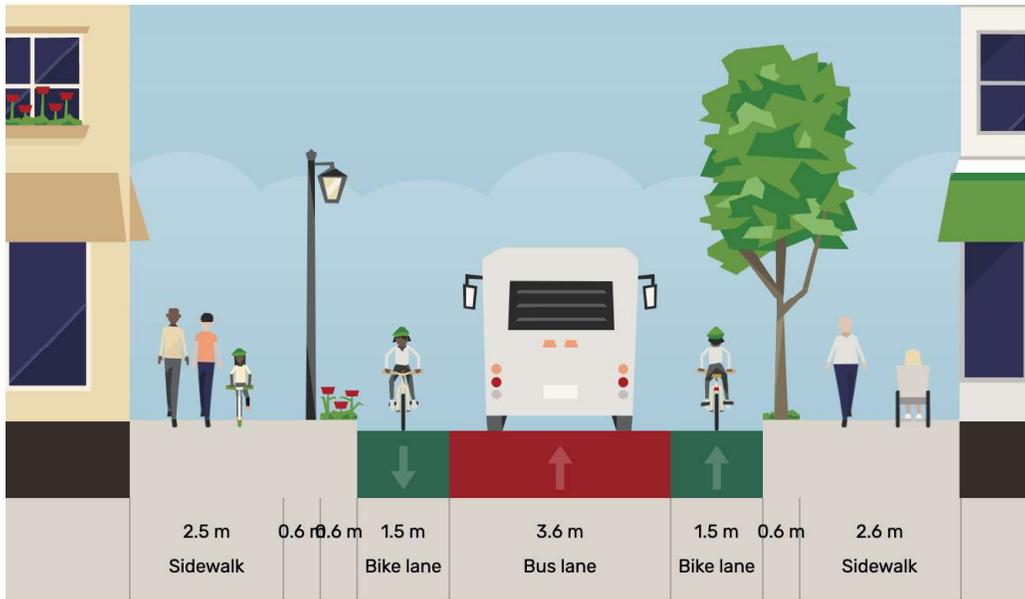


Figure 9. Typical cross section if N.S. Valderosa Avenue was transformed into a transit mall

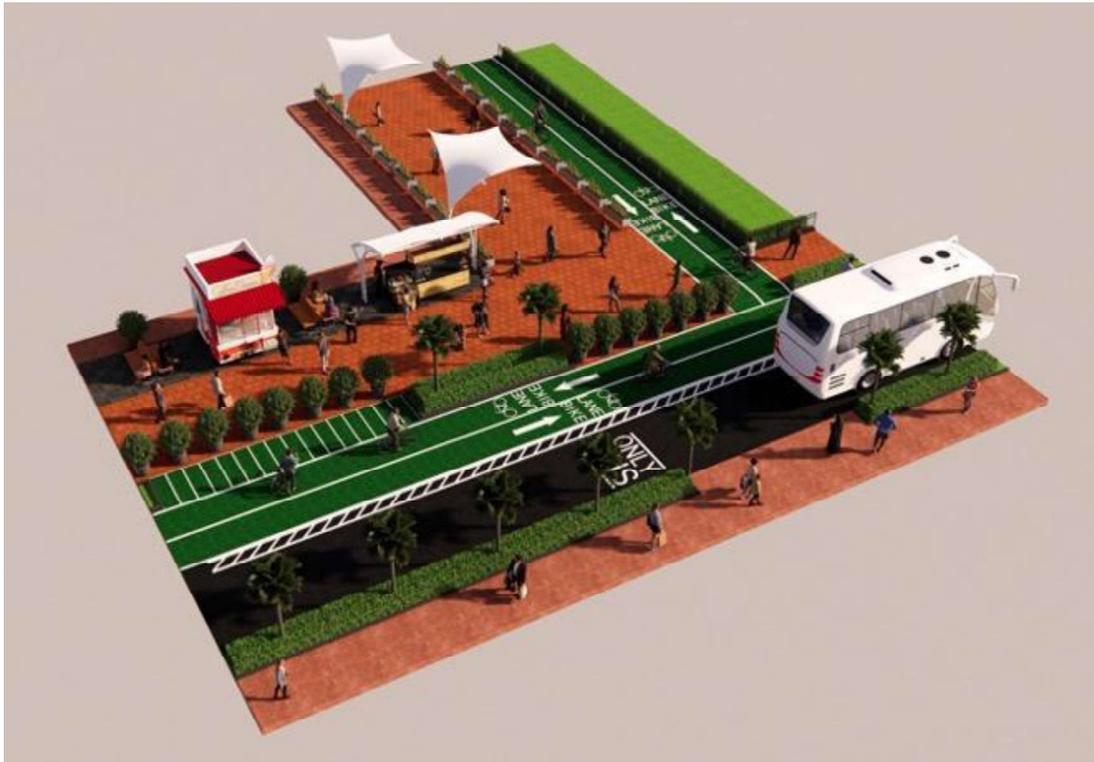


Figure 9. Perspective of shuttle service lane along N.S. Valderosa Avenue

## 4. Conclusion

### 4.1 Summary

This paper presented the development of a shuttle service plan for Zamboanga City using basic concepts of transit systems, and data for the city’s Local Public Transport Route Plan (LPTRP) and transport plan study. The plan is envisioned to provide a viable mode of transportation for the CBD that complements the city’s pedestrianization plan while reducing dependence on private cars. The pedestrianization plan is actually part of a larger active transport plan that is currently being formulated for the city that includes not only walking but cycling as well.

### 4.2 Recommendations

The following recommendations are made for the proposed shuttle service in Zamboanga City, whose route is shown in Figure 10. These recommendations are stated for the immediate, short, medium and long terms for consideration of city officials. These are in line with the concepts and principles of shuttle transit systems, and the considerations of the intent of the local government unit to initiate the provision of a shuttle service within the CBD.

Table 1. Shuttle service recommendations for the immediate- and short-terms

<b>Immediate term (within 1 year)</b>	<b>Short term (within 3 years)</b>
<ul style="list-style-type: none"> <li>i) The shuttle service route is as follows: N.S. Valderosa Avenue, right to Lustre, right going around Fort Pilar, left to N.S. Valderosa Avenue, right to Veterans Avenue, left to Campaner, left to Forest, right to Tomas Claudio, left to Purissima, right to Gov. Lim Avenue, right to Alejo Alvarez Street, right to Ledesma Road, right Mayor Climaco Avenue, left to J.S. Alano Street, and connect back to N.S. Valderosa Avenue</li> <li>ii) Purchase of three (3) units of mini-bus for immediate operations after approval of the proposed shuttle service plan to complement the LTFRB-approved LPTRP, which limits PUVs to enter the CBD and complement with the proposed Pedestrianization plan.</li> <li>iii) Consider the construction of all-weather waiting areas in the designated stops for loading and unloading of the shuttle service along its proposed route.</li> </ul>	<ul style="list-style-type: none"> <li>i) Consider purchasing additional units to accommodate more passengers, increase frequency of service, with corresponding decrease in headway, hence and increase level of service.</li> <li>ii) Ensure to construct facilities that will provide the seamless movement of passengers from the designated stops of shuttle service to the terminals of PUVs that served outside the CBD</li> <li>iii) Ensure to allocate resources or enough budget to operate the shuttle service, if not its full subsidy for operations</li> <li>iv) Identification of streets that can be designated for additional route of the shuttle service</li> <li>v) Draw out plan for additional loop/s that or the possibility of multiple loops that may intersect or overlap to facilitate shorter trips within the CBD</li> </ul>

*\*Implementation may be through City Engineering and/or in coordination with the DPWH*

*\*\*May require legislation/ordinance to strengthen the implementation of these recommendations*

Table 2. Shuttle service recommendations for the medium- and long-terms

<p align="center"><b>Medium term (within 6 years)</b></p>	<p align="center"><b>Long term (beyond 6 years)</b></p>
<ul style="list-style-type: none"> <li>i) Implementation of additional loop/s within the CBD from the identified additional streets for shuttle service operations</li> <li>ii) Ensure the adequate number of units to accommodate the possible increase in the ridership or demand for shuttle service operations within the CBD</li> <li>iii) Consider altering the design of the mini-bus into tranvia-type look to accompany and blend the cultural character of the city</li> <li>iv) Consider altering the road type in N.S. Valderosa Avenue from at least the segment in front of City Hall to For Pilar into cobble stones to create the cultural and heritage character of the area</li> <li>v) Draw out proposal for another loop that will intersect or overlap in some segments with the current loop/s, that will extend to the Integrated Bus Terminal or possibly to the new airport location</li> </ul>	<ul style="list-style-type: none"> <li>i) Ensure the proper maintenance and/or replacement of shuttle service units to maintain higher level of service</li> <li>ii) Ensure the operation of the shuttle service within the CBD is under the local government unit</li> <li>iii) Implement plan to connect additional loop/s that will connect the IBT and the new airport to the CBD (may intersect or overlap with current ones), with option of partial or no subsidy or private sector tendering/operations</li> <li>iv) Conduct an assessment of the operations and draw out plan to ensure the concepts of inter-modality and sustainable transport framework is achieved while maintaining the historical as well as the heritage character of the city</li> </ul>

*\*Implementation may be through City Engineering and/or in coordination with the DPWH*

*\*\*May require legislation/ordinance to strengthen the implementation of these recommendations*



Figure 10. Proposed shuttle route for the Zamboanga City CBD

## **ACKNOWLEDGEMENT**

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## **REFERENCES**

- City Government of Zamboanga City (2021) Comprehensive Transportation and Traffic Management Plan Study for the City of Zamboanga, Draft Final Report.
- City Government of Zamboanga (2019) Local Public Transport Route Plan for Zamboanga City, Final Report.
- City Government of Zamboanga (2015) Comprehensive Development Plan, 2016-2021, Final Report.
- City Government of Zamboanga (2003) Revised Master Development Plan of Zamboanga City, 1997 to 2012, Final Report.
- Vuchic, V. (2007) *Urban Transit Systems and Technology*. John Wiley & Sons.
- Department of Transportation (2017) Department Order No. 2017-011: Omnibus Guidelines on the Planning and Identification of Public Road Transportation Services and Franchise Issuance.
- Department of Transportation, Department of Interior and Local Government and Land Transportation Franchising and Regulatory Board (2017) Local Public Transport Route Plan Manual.