

Transportation Department – Traffic Engineering Division



## MEMORANDUM

**TO:** Transportation Commission  
**FROM:** Kurt Latt, P.E., PTOE, Senior Transportation Engineer *KAL*  
**DATE:** November 4, 2008  
**SUBJECT:** Bicycle Shared Lane Markings – *SHARROWS* Pilot Project

### Introduction

This memorandum provides a brief summary of a pilot project in Bellevue which installed bicycle shared lane markings, commonly referred to as Sharrows, on 161<sup>st</sup> Ave SE between SE 24<sup>th</sup> St and Eastgate Way SE. The picture below shows the recent Sharrow installation.



Sharrow Install in Bellevue  
 Looking Southbound on 161<sup>st</sup> Ave SE

This project was initiated to provide additional options for raising awareness of bicycle use along certain corridors and improve the safety and operating conditions of designated bicycle routes. The Sharrow project recently implemented in September of this year is the first use of this type of pavement marking in Bellevue. Early observations of the Sharrows are promising which may lead to more use of these markings in other key bicycle routes. The background for Sharrow use, initial performance and possible future plans are further described in this memorandum.

### Background

Prompted by the update of the City's Pedestrian and Bicycle Plan and increasing interest to improve safety and operating conditions for bicycle travel throughout the city, staff have been exploring various options to expand upon its "toolbox" of traffic control devices. State, County, and City agencies are required to follow the practices outlined in the Manual On Uniform Traffic

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Control Devices (MUTCD) when implementing features such as signs and pavement markings. Because the Sharrow is not yet an approved device in the MUTCD, the City of Bellevue sought and received permission from the Federal Highway Administration (FHWA) to perform a pilot project with the Sharrows. About a dozen cities across the country have also performed similar Sharrow projects which has made the approval process more streamlined than other exceptions to the MUTCD. Other agency experiences with the Sharrows are still being documented in many cases as it is a relatively new application and staff continues to research information as it becomes available. The attached letter to FHWA (May 30, 2008) better describes the background, placement of Sharrows, planned monitoring, and other aspects required within the standard format submission to FHWA.

## **Project Status**

The City's first Sharrow project was implemented for the segment of 161<sup>st</sup> Ave SE between SE 24<sup>th</sup> St and Eastgate Way SE in September 2008. The public outreach for the project included community flyer distribution (attached), door hangers, project listing in the city paper as well as numerous one-on-one conversations arising from the various field visits while designing the project.

As described in the letter to FHWA, this segment of 161<sup>st</sup> Ave SE was selected as a candidate site considering such factors as:

- consistency with the Ped/Bike Plan update and its key north/south, east/west corridors;
- constraints such as existing sidewalk, on-street parking, or native growth areas which would severely limit road widening in the future;
- traffic volumes which are not excessively high (below 10,000 ADT), yet sufficiently heavy to merit additional improvements. This essentially precludes Major Arterials and very low volume residential streets as candidates;
- relatively active bicycle use in corridor. It's important, particularly with the first use of the Sharrow, that the project be conducted on a roadway where drivers routinely see bicycle use.

With the above in mind, 161<sup>st</sup> Ave SE became a uniquely favorable candidate to observe the City's initial test for the Sharrow pavement marking. A key consideration was 161<sup>st</sup> Ave SE having on-street parking in the northbound direction only. This has allowed study of the Sharrow on the same roadway for a parking and non-parking condition. The Transportation Department has installed a temporary camera to video tape the "before" installation condition and is in the process of collecting the "after" condition observations and data.

One of the performance measures being considered is assessing the area being ridden by bicyclists within the travel way. With the "before" video taping, there were some bicyclists riding opposite direction to traffic or near parked car doors. The Sharrow depicts a type of chevron/arrow which should help reduce wrong way travel behaviors. The Sharrows are also placed in a manner that guides separation from the parked car doors swing to remind bicyclists of this potential hazard. In regards to the motorists, the Sharrow should remind drivers of the presence of bicyclists and to

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encourage drivers to provide adequate separation while passing bicyclists. Additionally, online feedback from other agencies using Sharrows suggests the markings promote greater good will between drivers and bicyclists and reduce confrontational or adverse behaviors.

Research on other agencies using Sharrows as well as initial observations are encouraging so far. Some positive feedback has been provided by bicyclists as well as nearby residents which appreciate the City's recognition for the importance of maintaining parking in these neighborhoods while promoting bicycle safety.

It must be emphasized, however, in light of the initial positive findings, that the Sharrow should not be considered an easy remedy applicable to improving many of the shortcomings of the broader bicycle system. Like any traffic control device, it has an appropriate place and circumstance for use with limitations on its benefits. The Sharrow does not substitute for a five-foot wide marked bike lane, for instance, where one can reasonably be provided in a highly used bicycle route. Having the separation afforded by a bike lane in certain corridors is important for the integrity of the system and caution must be exercised by staff, elected officials and the community to not overstate the applicability or benefit of a shared lane marking such as the Sharrow.

### **Future Activities**

Having been in place for about one month, it is too early to fully ascertain the benefits or possible negative aspects associated with the Sharrow markings. Since we are entering the winter season, it will be necessary to continue the review into early Spring as bicycle activity increases to fully evaluate conditions. Following our assessment in the Spring, additional candidate street segments will be considered if found to be an appropriate application and beneficial to system users.

The next candidate segment being considered, as identified in the letter to FHWA, is 164<sup>th</sup> Ave NE between NE 24<sup>th</sup> St and SE 14<sup>th</sup> St. The actual implementation of the Sharrows within this corridor may include only a portion of the length depending on circumstances as the review moves forward. It is also possible as additional assessments, research, feedback and design work are conducted, other candidate segments might present a more favorable option to implement. The current target is to implement another Sharrow project during the summer of 2009 should the initial pilot project prove to be of benefit to system users.

### **Commission Action:**

No action is required at this time. This memorandum is provided as information for Transportation Commission's use. If you have any questions regarding the use of Sharrows, please contact me (Kurt Latt) at 425-452-6020 or by email at [klatt@bellevuewa.gov](mailto:klatt@bellevuewa.gov).



Post Office Box 90012 • Bellevue, Washington • 98009 9012

May 30, 2008

Federal Highway Administration  
Office of Transportation Operations  
400 Seventh Street, SW, HOTO  
Washington, DC 20590

**SUBJECT:** Request for Permission to Experiment with Installation of Shared Lane Bicycle Markings (Sharrows)

To whom it may concern:

Pursuant to the Manual on Uniform Traffic Control Devices (MUTCD) Section 1A.10, the City of Bellevue requests permission to experiment with installation of pavement markings commonly referred to as Sharrows. The subject pavement markings are a combined bike and chevron symbol that delineates where both bicyclists and motorists will share a travel lane.

The following information outlines the project proposal and provides the information required in the MUTCD for Section 1A.10 Interpretations, Experimentations, Changes and Interim Approvals.

#### **A. Nature of the Problem:**

The City of Bellevue is a fast growing suburb with diverse land uses in employment, residential and commercial/retail areas. The resident population is about 120,000 with a daytime workforce exceeding 130,000. There exists many opportunities for non-motorized connecting trips both within the city and connections to neighboring cities.

Incorporated in 1953, Bellevue spent its first few decades building its transportation infrastructure with relatively little emphasis on providing designated bicycle lanes or pavement markings to support bicycle travel. This older infrastructure, with its built-out sidewalks and on-street parking on occasion, have limited the ability to retrofit and fully accommodate bicycle travel in certain corridors. In some instances, this older infrastructure precludes reconstructing sidewalk or making other street modifications to accommodate bicycle travel via a striped bicycle lane or facility.

In recent years, the City of Bellevue has made an increasing commitment to enhancing and promoting bicycle travel. Bellevue is currently updating its Pedestrian and Bicycle Plan which identifies many routes throughout the city to not only be inclusive of bicycle use but promote greater awareness and safety for bicyclists. This plan will also be the building block for funds allocation and roadway treatment options benefiting bicyclists.

The City of Bellevue currently utilizes traffic control devices such as bike signing and bicycle symbols for its bicycle lanes as allowable in the MUTCD. However, for certain older more

established streets it would be impractical to modify the street in a manner that would utilize the limited treatments in the current MUTCD. An alternative from the currently adopted bicycle treatment standards is clearly needed in certain street segments.

Some cities across the country have begun experimenting with various pavement marking treatments to improve safety and raise awareness of bicycle use in a corridor where standard bicycle lanes can not be provided. Based on trials currently in progress by other city's, the City of Bellevue's Transportation Department finds merit in considering a new pavement marking treatment, which is not available in the current MUTCD, in an effort to improve safety and operating conditions for bicyclists. This alternative treatment would be a shared lane bicycle marking legend commonly referred to as a Sharrow. It is our understanding that the Sharrow is being considered for the next edition of the MUTCD but that it may be considerably more time before it is adopted as a standard. Hence, this request for experimentation of the shared lane bicycle marking.

## **B. Description of Proposed Experiment:**

The City of Bellevue has identified three street segments within its jurisdiction which would be candidates for the Sharrow pavement marking treatment. The attached map in Figure 1 shows the location of the corridors and the approximate limits affected. Figure 2 depicts the Shared Lane Bicycle Marking or Sharrow.

The Sharrow pavement markings are proposed to be placed within the travel way at spacings of about 250 to 500 feet which is consistent with Bellevue's current standards for bicycle lane symbol markings. The placement within the roadway would vary depending on the presence of on-street parking, lane width and other factors.

An example of a possible Sharrow placement is depicted in Figure 3 where on-street parking exists. This is a conceptual layout and small deviations based on Engineering Judgment may occur when implemented. Placement of the Sharrow at 11 feet from face of curb, as depicted in figure 3, is consistent with other cities practices. This placement encourages bicyclists to ride outside the door swing of parked cars while reminding drivers that they are required by Washington state law to share the roadway with bicyclists.

Bellevue's Transportation Department intends to prepare project plans and specifications for use by a contractor to install the Sharrow pavement markings. It is our intent that the three street segments be implemented in three distinct yearly cycles giving an opportunity to review and assess the conditions of prior implementation efforts. This phasing sequence is described in more detail below.

## **C. Illustration of Shared Lane Bicycle Marking (Sharrow):**

See Figure 2 for an illustration of the Sharrow.

## **D. Supporting Data on Development and Use**

An increasing number of cities across the country have or are currently experimenting with shared lane bicycle markings on roadways. One study in particular, performed for the City of San Francisco (CA), demonstrated the shared lane bicycle markings had a positive impact on

motorist and bicyclist behavior, position and safety. The study also resulted in the adoption of the Sharrow pavement legend as an allowable marking treatment by the California Traffic Control Devices Committee.

In recent months, the City of Seattle (WA) located immediately west of the City of Bellevue has implemented approximately 12 miles of these pavement marking treatments with plans for additional coverage in the coming year. Thus far, the use of these markings have been well received by bicyclists and the community at large.

## **E. Patent and Copyright Statement**

The Shared Lane Bicycle Marking (Sharrow) as depicted in Figure 2 is not copyrighted. Cities including Denver (CO), Portland (OR), San Francisco (CA), Gainesville (FL), Cambridge (MA), Fort Collins (CO), Oakland (CA), Alexandria (VA), and Seattle (WA) have experimented with this marking, which would imply there is no patent protection for this symbol. The latest proposed revisions to the MUTCD have included this symbol as well which also support unrestricted (but guided) use of the symbol in the future assuming these revisions are maintained in later adopted versions of the MUTCD.

## **F. Time Period and Locations for Experimentation**

The City of Bellevue proposes to separate the three candidate corridors in timeline so the first street segment selected has the greatest opportunity for success and acceptance by the public. As shown in Figure 1, the first segment would be the 161<sup>st</sup> Ave SE corridor. This segment has two travel lanes with on-street parking which is striped on one side of the road. Bellevue's Transportation Department intends to implement this first segment this year with the other two street segments (i.e., Main Street and 164<sup>th</sup> Ave) considered for implementation following our assessment of the initial corridor's performance.

These streets were chosen with consideration given to the following factors:

- Selection of at least one key North/South and one key East/West corridor in the City's updated Pedestrian/Bicycle Citywide Plan
- Opportunities for use of a shared lane marking symbol where current street infrastructure is effectively built out and modification of the roadway section is impractical to include marked bike lanes
- Posted speed limit of 30 mph or less.
- Opportunity for evaluating a shared lane marking in conjunction with on-street parking
- Traffic volumes below 10,000 ADT.
- Relatively active bicycle use in corridor.

## **G. Research and Evaluation Plan**

The City of Bellevue Transportation Department will conduct the experiment placing the Sharrows on the aforementioned candidate streets and in the timeline expressed herein.

The planned monitoring and evaluation process is as follows:

1. The City of Bellevue will install Sharrows on 161<sup>st</sup> Ave SE within the limits shown on Figure 1.
2. Legends will be applied at a typical rate of 250 to 500 foot spacing depending on specific characteristics of the segment.
3. Signs specifically associated with the Sharrows will not be placed at each legend at this time in keeping with common practice of other agencies experimenting with the legends. However, an introductory or informational sign may be provided at beginning and end of the project limits. The sign colors and messaging, if used, would be consistent with allowable guidance already contained in the MUTCD.
4. Bicycle lane markings consistent with Bellevue's standard practices and depicted in Figures 4 and 5 will be pursued in several segments. There are portions of some streets which afford the ability of marking the travel way with a designated bike lane. This will be beneficial in observing driver and bicyclists behavior within the same corridor and under the two distinct pavement marking treatments.
5. Data collection will be conducted for time periods before and during the experimentation. Data will include traffic volumes, speed studies, and observations. The City's Transportation Department will video record at least one segment to include both directions of travel for later playback and observation of activity in the roadway. Observations of driver and bicyclists behavior will be noted and summarized.
6. Progress statements will be prepared as necessary to document the ongoing conditions of the experimentation. A final report will be prepared by Bellevue's Transportation Department and submitted to FHWA.

## **H. Application Restoration**

The City of Bellevue Transportation Department agrees to restore the affected areas within three months following the end of the time period of the experiment and terminate the experiment as required in Section 1A.10 if an unsafe condition develops. If the experiment appears successful, the City of Bellevue may apply Shared Lane Bicycle Markings (Sharrows) to additional streets in its bicycle network plan to test similar conditions. In addition, the City of Bellevue may further support the inclusion of these markings in the next edition of the MUTCD.

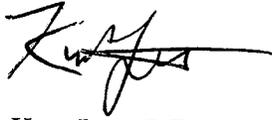
## **I. Progress Reports**

The City of Bellevue agrees to provide progress reports as necessary during the term of the experimentation. A final report will also be prepared and submitted to FHWA within 3 months following completion of the experimentation.

In closing, the goal of this project is to improve safety and operations for bicyclists where bicycle lanes are not feasible. The City of Bellevue intends to utilize shared lane bicycle markings (Sharrows) only after other possibilities that would allow marked bicycle lanes to occur have been explored.

We appreciate FHWA's review of this matter and if there are any questions, I can be reached at 425-452-6020 or email [klatt@bellevuewa.gov](mailto:klatt@bellevuewa.gov).

Sincerely,

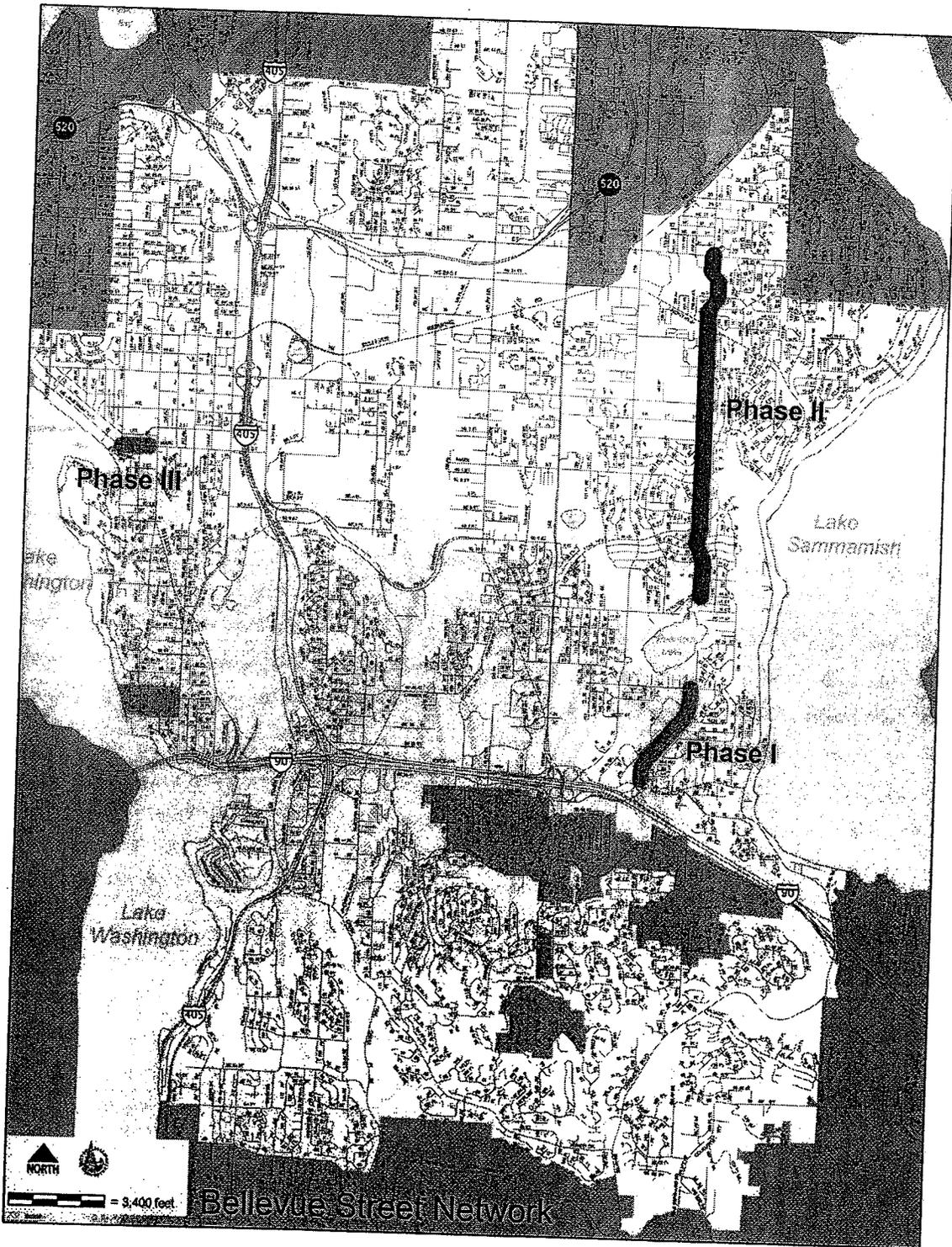


Kurt Latt, P.E., PTOE  
Senior Transportation Engineer  
Bellevue Traffic Engineering Division

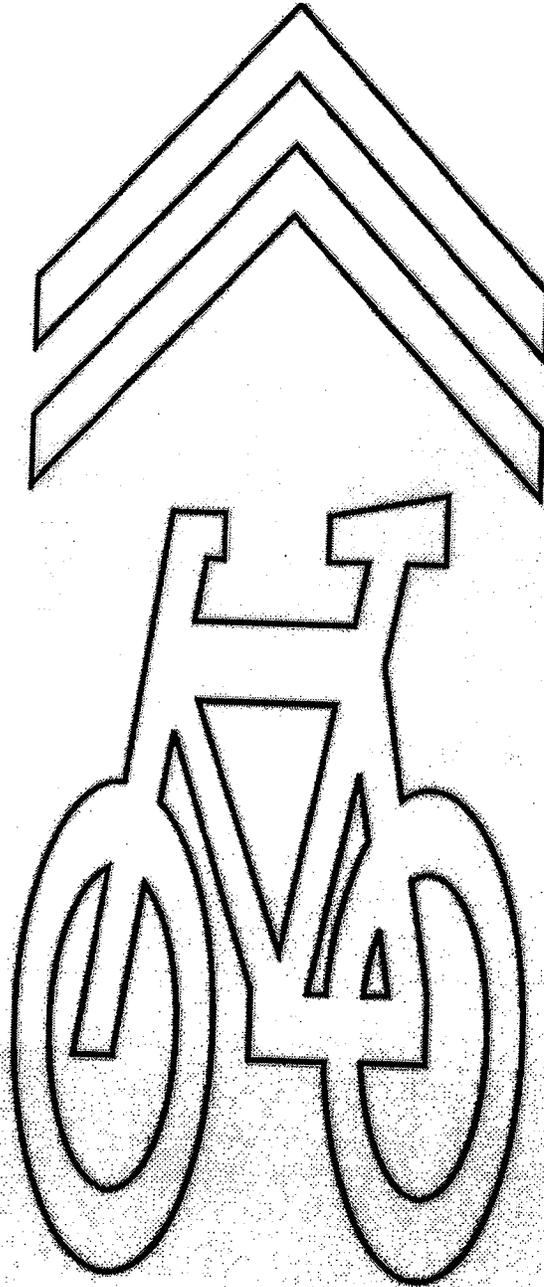
Attachments:

- Figure 1 – Sharrow Bicycle Corridors
- Figure 2 – Sharrow (Shared Lane Marking)
- Figure 3 – Example Placement of Sharrows
- Figure 4 – Bellevue Standard Drawing TE-17 Bicycle Lane Channelization
- Figure 5 – Bellevue Standard Drawing TE -20 Bike Lane Marking

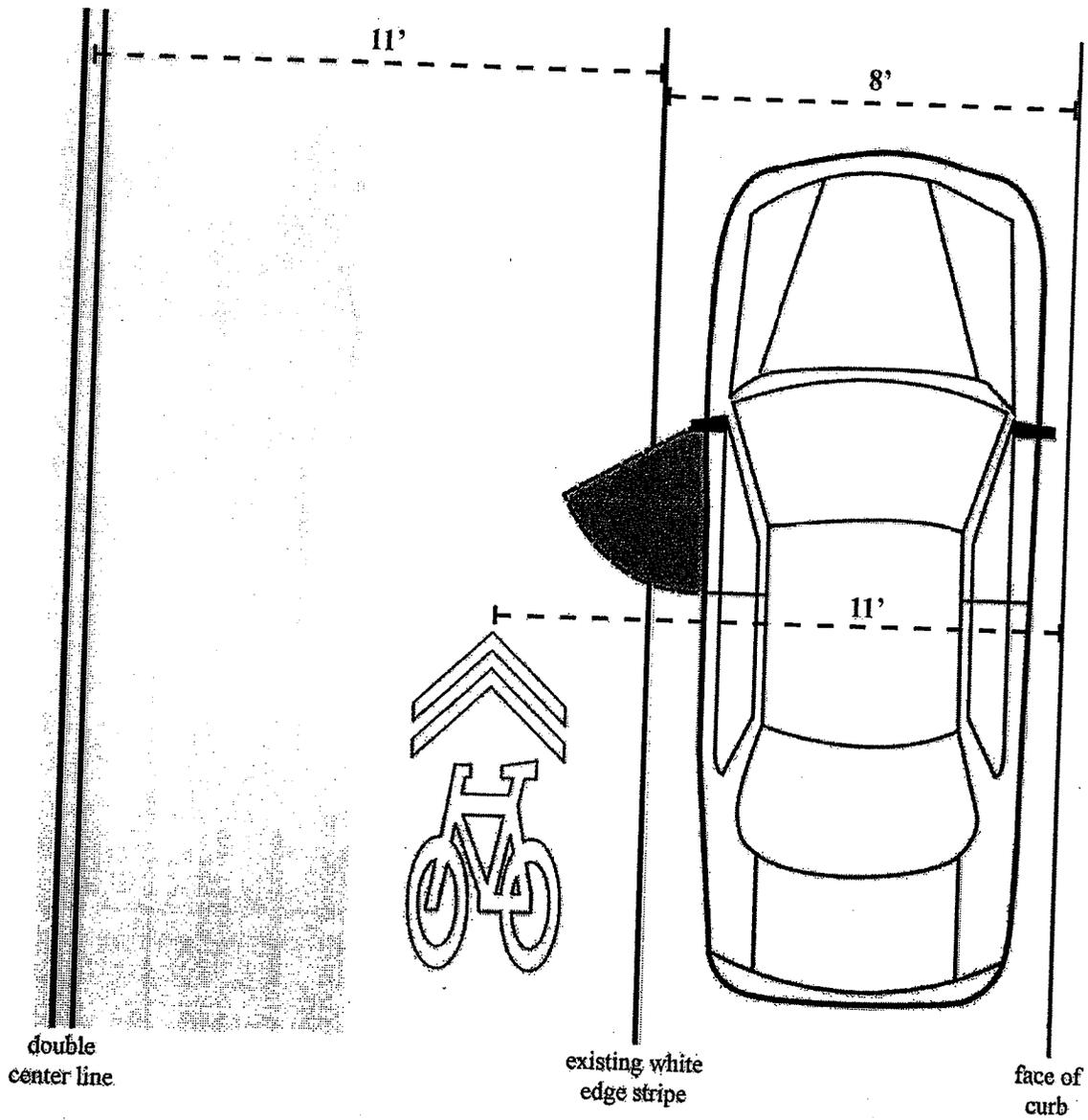
cc: Goran Sparrman, P.E., Director, City of Bellevue Transportation Department



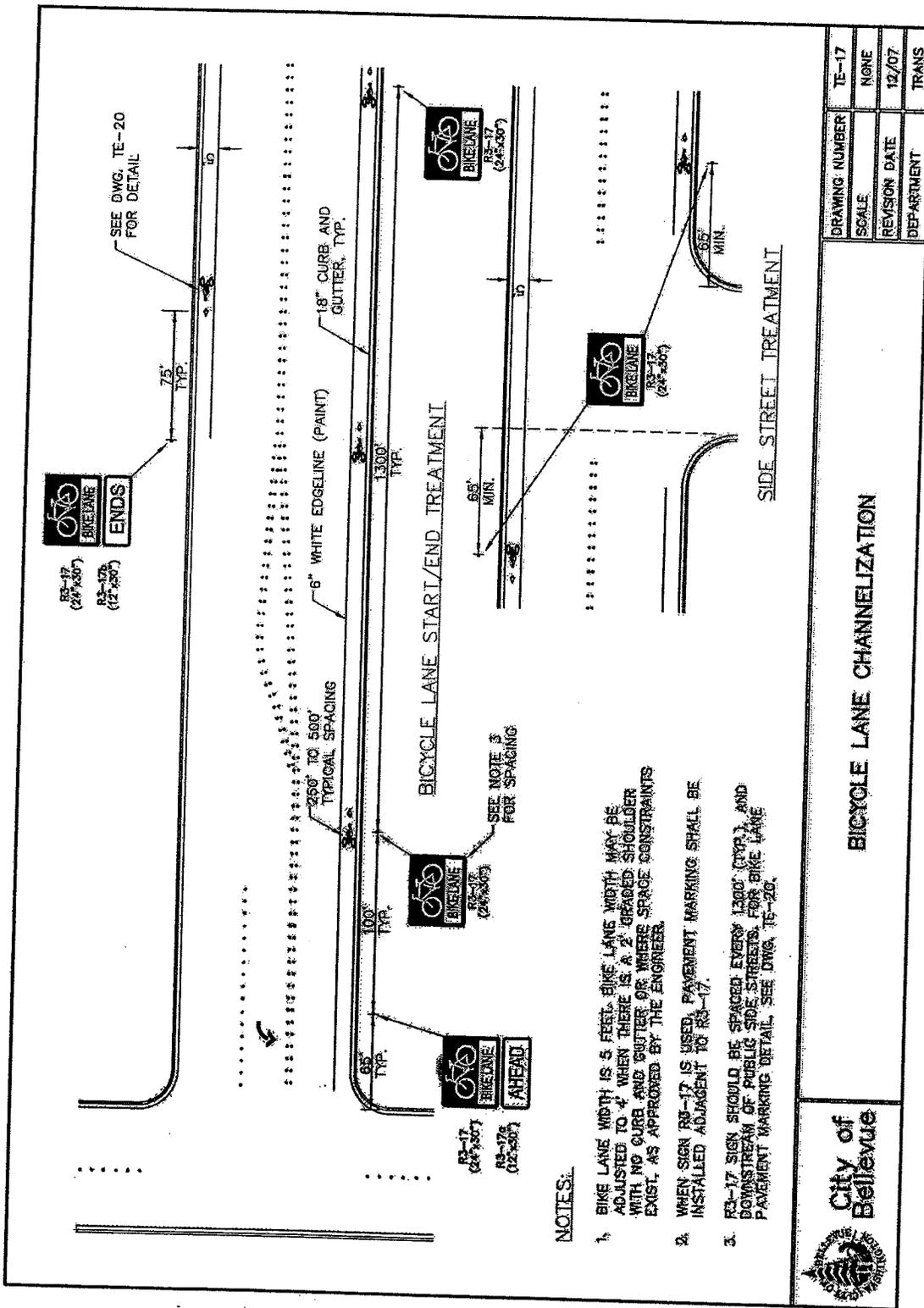
**Figure 1**  
Sharrow Bicycle Corridors



**Figure 2**  
Sharrows  
(Shared Lane Marking)



**Figure 3**  
Example Placement of Sharrows



DRAWING NUMBER	TE-17
SCALE	NONE
REVISION DATE	12/07
DEPARTMENT	TRANS

**BICYCLE LANE CHANNELIZATION**

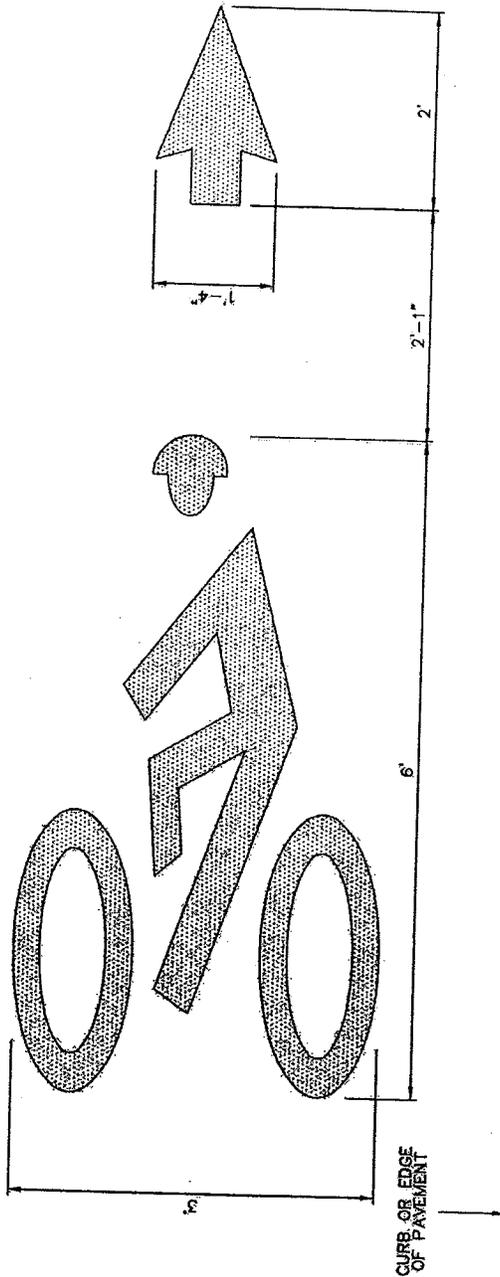


- NOTES:**
- BIKE LANE WIDTH IS 5 FEET. BIKE LANE WIDTH MAY BE ADJUSTED TO 4' WHEN THERE IS A 2' BARED SHOULDER WITH NO CURB AND OUTLET OR WHERE SPACE CONSTRAINTS EXIST, AS APPROVED BY THE ENGINEER.
  - WHEN SIGN RS-17 IS USED, PAVEMENT MARKING SHALL BE INSTALLED ADJACENT TO RS-17.
  - RS-17 SIGN SHOULD BE SPACED EVERY 1300' (TYP.) AND DOWNSTREAM OF PUBLIC SIDE STREETS. FOR BIKE LANE PAVEMENT MARKING DETAIL, SEE DWG. TE-20.

**Figure 4**  
**Bellevue Typical Bike Lane Channelization**

**NOTES:**

1. BICYCLE LANE MATERIAL SHALL BE LOW PROFILE PREFORMED THERMOPLASTIC (90 MIL.).
2. DIMENSIONS: ADJUSTMENTS TO DIMENSIONS SHALL BE APPROVED BY THE ENGINEER.



**BIKE LANE MARKING**

DRAWING NUMBER	TE-20
SCALE	NONE
REVISION DATE	12/07
DEPARTMENT	TRANS

**Figure 5**  
Bellevue Bike Lane Markings



CONSTRUCTION

# Here's What's Happening

SEPTEMBER 2008

## COMING SOON to 161<sup>st</sup> Avenue SE: SHARROWS



**Sharrows** are pavement markings installed within travel lanes, alerting motorists they should expect to see and share the lane with bicyclists. In addition, sharrows help bicyclists position themselves in the lanes, in such a way that motorists are able to safely pass them.

The Transportation Department will begin a pilot project installing sharrows on 161<sup>st</sup> Avenue SE between SE 24<sup>th</sup> Street and Eastgate Way by the end of October, weather permitting. The markings, which include a bicycle legend with arrows at the top, will be placed every few hundred feet on the pavement. There will be no other striping, signing or parking changes.

Bellevue recognizes the importance of improving bicycle safety while maintaining on-street parking in certain areas. Sharrows offer a promising way of accomplishing this at a relatively low

cost. These markings have been successfully used in other cities across the country, including Seattle, and will be evaluated here in Bellevue over the next six months.

**For more information:** Contact Kurt Latt, senior transportation engineer, at 425-452-6020 or email [klatt@bellevuewa.gov](mailto:klatt@bellevuewa.gov).

### What do sharrows mean for bicyclists and drivers?

#### **Bicyclists:**

- Use the sharrow to guide where you ride within the lane – generally through the center of the sharrow when safe to do so.
- Remember not to ride too close to parked cars – watch for opening doors
- Be aware of your surroundings and follow the rules of the road

#### **Drivers:**

- Expect to see bicyclists on the street
- Remember to give bicyclists space when passing
- Be aware of your surroundings and follow the rules of the road



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# ECRWSS POSTAL CUSTOMER

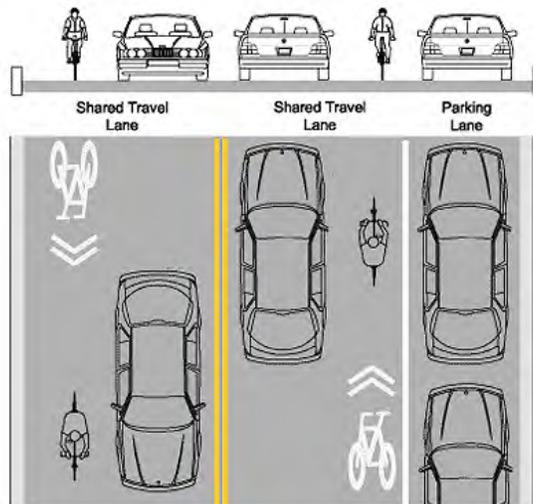


Sharrows  
161st Avenue SE

PRSRF STD  
US Postage  
PAID  
Bellevue, WA  
Permit No. 61

City of Bellevue  
Transportation Department  
PO Box 90012  
450 110th Avenue NE  
Bellevue WA 98009-9012

## What will sharrows look like on 161<sup>st</sup> Avenue SE?



Existing travel lanes and parking do not change  
(Heading north on 161<sup>st</sup>)

**Title VI Notice to the Public** It is the City of Bellevue's policy to assure that no person shall on the grounds of race, color, national origin or sex, as provided by Title VI of the Civil Rights Act of 1964, be excluded from participating in, be denied the benefits of, or be otherwise discriminated against under any of its federally funded programs and activities. Any person who believes his/her Title VI protection has been violated may file a complaint with the Title VI Coordinator. For Title VI complaint forms and advice, please contact the Title VI Coordinator at 425-452-4270.