



# Freight Transport and Community Health

Excerpted from:

## *Measuring What Matters: Neighborhood Research for Economic and Environmental Health and Justice in Richmond, North Richmond, and San Pablo*



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# FREIGHT TRANSPORT AND COMMUNITY HEALTH



*Cars at the Port of Richmond to be loaded onto cargo trains*

In the morning, Lee Jones notices little black particles of soot on the roses in his front yard. “One day, as I started to rinse the spots off my roses, I noticed the side of my house also had all this black soot on it. After washing it off, I realized a couple of months later that it was right back there again.” Mr. Jones is concerned about the effects this soot has on his family’s and community’s health, not to mention the well-being of his beautiful roses. “I never had this much of a problem with bronchitis ‘til I moved out here,” says Mr. Jones, a North Richmond resident.

This soot is one type of air pollution known as particulate matter (PM), comprised of microscopic pieces of solid or liquid pollutants in the air. Burning fuel is a major source of particulate matter in urban communities, and in particular, the burning of diesel. Sources of particulate matter from diesel include the diesel engines running the trains, cargo trucks, ships, and construction equipment at the port, rail yards, rail tracks, freeways, and city streets in West County.

Breathing in **diesel exhaust contributes to cancer, asthma, heart disease, premature birth, and other health conditions.**<sup>1</sup> Diesel exhaust poses more cancer risk than any other air contaminant in California. According to the Bay Area Air Quality Management District, **81% of all cancer risk from air pollution in the San Francisco Bay Area comes from diesel particulate matter.**<sup>2</sup> Diesel

exhaust not only produces particulate matter, but it also contains 450 different chemicals, 40 of which are considered toxic air contaminants by the California Environmental Protection Agency.

Residents of West County live at a crossroads of global trade where new cars, petroleum, and other products make their way on diesel-fueled ships, trucks, and trains from production sites around the world to consumers in the United States. The infrastructure in West County that supports this trade includes the Port of Richmond, the Burlington Northern Santa Fe Richmond (BSNF) rail yard, several dozen warehouses and distribution centers, 15 miles of railway, two Interstate highways, and a system of local streets and avenues frequently used by trucks. Each day, this infrastructure supports the movement of an average of seven ships that enter the Port of

Richmond,<sup>3,4</sup> 7,000 trucks that travel on West County highways,<sup>5</sup> and 29 freight trains<sup>6</sup> (not including passenger trains) that arrive, depart, or pass through the BNSF Richmond rail yard.<sup>7,8</sup> Further, a daily average of 13,000 truck trips are made on West County streets and avenues to access highways, by-pass traffic, or access food and fuel locations.<sup>9-10</sup> In addition, the Chevron refinery and other oil manufacturing operations in West Contra Costa County rely on diesel-fueled oil tankers to receive raw petroleum and on tanker trains and trucks to move finished products from the refineries. Much of this infrastructure abuts areas where West County residents live, work, and play.

As a result, **a total of more than 90 tons of diesel pollution is released in West Contra Costa County every year.**<sup>11</sup> This translates into **six times more diesel pollution released per square mile than in the County as a whole, and 40 times more than in the state as a whole.**<sup>12</sup>

Residents living closest to the streets, freeways, and railroad tracks used by freight trucks and trains are exposed to higher levels of air pollution and face greater risk of suffering health impacts. The California Air Resources Board (CARB) has found that living close to these freight transport areas is associated with a reduction in

lung function of children and an exacerbation of asthma and other respiratory health conditions.<sup>13</sup> In addition, a host of other severe public health threats are caused by the close proximity of trucks, trains, ships, and their associated land uses to residential communities, including noise, vibration, reduced visibility, and neighborhood blight—all of which are linked with real health impacts on school performance,<sup>14</sup> pedestrian safety, ability to sleep or concentrate, and overall physical and mental health.<sup>15</sup>

The volume of goods imported and otherwise moved through West Contra Costa County is expected to increase significantly in the coming years, which means potential increases in the environmental and health impacts of this industry. For example, the Port of Oakland has proposed an expansion of the “Martinez Subdivision” rail line segment that it relies on to transport containerized cargo north from the Port to Northern California and beyond. Currently, an average of 18 trains travel through West County daily, which the Port says will increase by 20 per day with the rail expansion project.<sup>16</sup>

While all West County residents are affected in one way or another, those who live closest to freight transportation infrastructure are most vulnerable.

## WHAT DID OUR RESEARCH FIND?

Our research looked at the number of households within a high-risk zone of freight transportation infrastructure in West Contra Costa County. The California Air Resources Board has recommended limits on how close sensitive sites—like homes, parks, school yards, daycare facilities—should be to a rail yard, distribution center, freeway, and high truck-traffic street (see Table 1).<sup>17</sup>

CARB concludes that if these recommendations are followed, exposure to air pollutants can be reduced by 80%. Although these recommendations only apply to future developments, CARB’s conclusions suggest that people already living this close to freight transportation sites are at elevated risk.

The Indicators Project looked into who currently lives within these high-risk areas near freight transport in West Contra Costa County neighborhoods. This indicator calculates the number of homes and apartment units within 500 feet of the freeway or parkway, 1,000 feet of a rail yard, and 500 feet of a “truck generator.”<sup>18</sup> We also included a 500-foot area surrounding the rail tracks within a mile from the rail yard.<sup>19</sup> By estimating the number of homes and apartments located in these areas,

**Eighteen percent, or nearly one in five households in Richmond, North Richmond, and San Pablo, are within 500 or 1000 feet of freight transportation infrastructure in West County.**

we can estimate the number of households currently living with elevated exposure to air pollution and increased risk to the health impacts of freight transport.

**Table 1. RECOMMENDED DISTANCES BETWEEN FREIGHT TRANSPORT AND SENSITIVE LAND USES**

	Recommended Distance from Sensitive Sites <sup>19</sup>
<b>Rail Yard</b>	1,000 feet
<b>Freeway or High-Traffic Road</b>	500 feet
<b>Distribution Center</b>	500 feet

Data Source: California Air Resources Board, 2005

**Table 2. HOUSEHOLDS NEAR FREIGHT TRANSPORT HAZARDS BY NEIGHBORHOOD**

Neighborhood	Median Household Income	Percentage People of Color	Percentage of Population Under Age 18	Number of Households Near one or more Freight Hazards	Percentage of Households Near One or More Freight Hazards
May Valley	\$60,348	47%	24%	0	0%
Hilltop Village	\$66,500	81%	19%	0	0%
Hasford Heights	\$43,822	53%	24%	0	0%
Greenridge Heights	\$43,822	53%	24%	0	0%
Greenbriar	\$79,914	53%	23%	0	0%
El Sobrante Hills	\$79,914	53%	23%	0	0%
Countryside	\$91,938	50%	24%	0	0%
Carriage Hills South	\$91,938	50%	24%	0	0%
Carriage Hills North	\$79,914	53%	23%	0	0%
North and East	\$45,147	76%	27%	268	5%
Fairmede/Hilltop	\$50,443	87%	26%	78	5%
Laurel Park	\$60,536	96%	30%	31	8%
Belding Woods	\$36,100	91%	35%	237	11%
Hilltop Green	\$57,012	64%	25%	87	16%
North Richmond	\$24,131	95%	35%	159	17%
Forest Park	\$9,709	94%	22%	15	18%
Marina Bay	\$74,798	52%	12%	199	19%
Park Plaza	\$40,295	98%	29%	173	19%
Pullman	\$38,307	97%	35%	177	24%
Coronado	\$32,978	93%	28%	295	25%
Richmond Annex	\$47,530	51%	17%	541	27%
Undesignated Richmond Neighborhood	\$48,660	73%	20%	897	28%
East Richmond	\$57,563	52%	21%	318	29%
Point Richmond	\$73,125	16%	9%	460	33%
Park View	\$30,750	95%	35%	199	36%
Cortez/Stege	\$26,373	98%	37%	349	38%
Eastshore	\$38,438	99%	32%	119	38%
Santa Fe	\$28,768	97%	38%	239	38%
Iron Triangle	\$26,011	97%	36%	977	38%
Shields-Reid	\$23,313	98%	38%	179	39%
Metro Richmore Village	\$39,955	89%	33%	122	44%
Hilltop Bayview	\$46,766	71%	16%	62	51%
Panhandle Annex	\$30,750	95%	35%	153	51%
City Center	\$31,918	95%	37%	357	59%
Parchester Village	\$28,974	84%	20%	257	63%
Atchison Village	\$29,107	80%	32%	64	67%
Southwest Annex	\$33,250	75%	24%	552	93%
<b>Richmond Total</b>	<b>\$44,210</b>	<b>79%</b>	<b>28%</b>	<b>7,564</b>	<b>19%</b>
<b>San Pablo Total</b>	<b>\$37,184</b>	<b>84%</b>	<b>32%</b>	<b>905</b>	<b>12%</b>
<b>Richmond, North Richmond and San Pablo total</b>				<b>8,469</b>	<b>18%</b>

## WHAT DOES THIS MEAN FOR WEST COUNTY?

A total of 8,469 households in Richmond, North Richmond, and San Pablo, housing approximately 24,308 residents, are within 500 or 1000 feet of freight transportation infrastructure in West County. This is 18%, or nearly one-in-five households in these areas.

While, overall, Richmond and San Pablo have high numbers of people near freight transport health hazards, the concentrations of trucks and trains are especially high in neighborhoods with lower income, more people of color, and more people under age 18. Neighborhoods where the percentage of homes near freight transport hazards is greater than average have a median household income of \$37,501 and are 82% people of color; for neighborhoods where this percentage of homes is less than average, the median income is \$57,571 and percent people of color is 69%.

West County residents have vocalized a number of concerns about the impacts of freight transport on their families and communities. The “Community Concerns” listed below were articulated by West County residents who participated in a series of community workshops in 2007 and 2008 as part of Project 12898 (conducted

by the Neighborhood House of North Richmond, West County Toxics Coalition, Contra Costa Health Services, and the Pacific Institute).

### Community Concerns with Expanded Freight Trains and Trucks:

- Noise/vibrations
- Pollution/soot
- Difficulty crossing streets due to truck and train traffic
- Pedestrian safety issues
- Health problems
- Traffic congestion
- Train idling
- Damage to streets and sidewalks from trucks
- More problems at railroad crossings
- Emergency response delays due to train blockages
- Negative impact on local business
- Lowered tax revenue
- Impacts on plants/vegetation
- Quality of life
- Less viable housing

## WHAT CAN WE DO?

During these community workshops, West County residents also developed solutions for reducing the negative impacts of freight transport in their neighborhoods:

### Reduce the impacts of existing freight-transport-related land uses.

Require fencing and shrubbery and sound walls along freeways, railroad tracks, and businesses that attract trucks and trains. Create designated quiet zones to minimize train horns in residential areas. Change train schedules to avoid peak hours, and notify residents of train schedules to minimize delays at intersections. Implement better signage, traffic calming, and other measures to improve pedestrian safety.

### Separate residential areas from freight transport-related land uses through sound land use planning.

Require buffer zones between areas zoned for residential development and freight transport corridors as well as land uses that attract truck and train traffic. Work with residents to change truck routes to avoid residential areas. Build overpasses or underpasses that enable pedestrians, cars, and emergency vehicles to safely cross train tracks and alleviate long train blockages at intersections.

### Encourage the development of green business and other minimally polluting, non-residential land uses next to freight-transport-intensive land uses.

Provide incentives to attract new green businesses and convert existing businesses to green businesses. Areas designated as high-risk zones should be zoned to attract green businesses that meet community needs while minimizing additional pollution in an already overburdened community. Green businesses should be required to minimize pollution and other negative impacts from their operations, as well as their end product.

### Provide an accountable public process that requires developers to consult with impacted residents.

Proposals that could result in increases in truck and train traffic in West County neighborhoods should be discussed with impacted community residents before decisions that approve such developments are made. The impacts and mitigation measures identified by residents should be integrated into development proposals and environmental impact assessments as a precondition of their approval by permitting, regulatory, and planning agencies.

## COMMUNITY RESOURCES FOR INFORMATION AND CHANGE

There are several community groups taking leadership in West County on advancing solutions to the problems of freight transport and working for environmental health and justice:

### Contra Costa County Asthma Coalition

Cedrita Claiborne  
597 Center Ave. #115  
Martinez, CA 94553  
925.313.6861  
[www.cchealth.org/topics/asthma](http://www.cchealth.org/topics/asthma)

### Neighborhood House of North Richmond

Lee Jones or Jannat Muhammad  
820 23<sup>rd</sup> St.  
Richmond, CA 94804  
510.229.5041  
[www.nhnr.org](http://www.nhnr.org)

### West County Toxics Coalition

Dr. Henry Clark  
305 Chesley Ave.  
North Richmond, CA 94801  
510.232.3427  
[www.westcountytoxicscoalition.org](http://www.westcountytoxicscoalition.org)

## RESEARCH METHODS

### Data

The data used for the freight transport indicator is not always easy to obtain, but it is possible and it is the right of the community to have access to information about the issues affecting our lives. The sets of data we used were:

Data	What it is	Where to get it
Demographics	An Excel table with population numbers by census tract	See Demographics Methods on page 105.
Rail lines	A Geographic Information System (GIS) shapefile of the rail lines in Contra Costa County	Kristine Solseng, Senior GIS Planner Community Development Department, Contra Costa County 651 Pine St, 4th Floor, North Wing Martinez, CA 94553 925.335.1271 <a href="mailto:ksols@cd.cccounty.us">ksols@cd.cccounty.us</a>
Parcels	A GIS shapefile of the parcel lines and property information	Roi Evron, GIS Administrator IT Department, City of Richmond 1401 Marina Way South Richmond, CA 94804 510. 621.1298 <a href="mailto:roi_evron@ci.richmond.ca.us">roi_evron@ci.richmond.ca.us</a>
Truck generators (distribution centers)	A list of the businesses that attract freight trucks	<i>Truck Route/Weight Limitations Survey for West Contra Costa County</i> , prepared for the West Contra Costa Transportation Advisory Committee (WCCTAC) by Dowling Associates, Inc., December, 2001. For a copy, contact WCCTAC 510.215.3042 or email <a href="mailto:wcctac@ci.san-pablo.ca.us">wcctac@ci.san-pablo.ca.us</a> .

### Methodology of Analysis

The analysis of this data utilized ArcGIS, Excel, and Access software programs. ArcGIS was used to measure particular areas surrounding all freight transport hazards and identify the residential parcels within these buffer areas. We then exported the attribute table of parcels within the buffer area, giving us a table of information for every property near the rail lines. Parcel data included the number of units at each residence, which we used as a proxy for the number of households affected. We then used the average persons per household from the 2000 Census of Richmond and San Pablo to estimate the number of people affected.

### Want to Do Your Own Research on this Issue?

**Find the distance from your house or school to a rail track.** You can use Google Earth, a program available for free online at <http://earth.google.com/products.html>. Once you download the program, type in the desired address in the box where it says “Fly to” and then click “Return.” Locate the rail tracks closest to the address by scrolling around. At the top of your screen, click on a little blue ruler. Click on the two points between which you want to measure the distance. In the little box labeled “Ruler,” the distance between the two points will appear.

## REFERENCES

- 1 U.S. EPA. (2002). Health Assessment Document for Diesel Engine Exhaust. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment, Washington Office, Washington, D.C. Retrieved June 30, 2008 from <http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=29060>.
- 2 Bay Area Air Quality Management District. (2006). Community Air Risk Evaluation Program: Phase 1 Findings and Policy Recommendations Related to Toxic Air Contaminants in the San Francisco Bay Area. San Francisco, California: Bay Area Air Quality Management District. Retrieved June 30, 2008 from [http://www.baaqmd.gov/CARE/care\\_documents.htm](http://www.baaqmd.gov/CARE/care_documents.htm).
- 3 Army Corps of Engineers. (2006). Waterborne Commerce of the United States - Calendar Year 2006, Part 4 - Waterways and Harbor of Pacific Coast, Alaska and Hawaii. Institute for Water Resources. Retrieved November, 2008 from <http://www.iwr.usace.army.mil/ndc/wcsc/wcsc.htm>.
- 4 The original source presents information as a yearly figure of 2,404 inbound trips. These trips include: self propelled and non-self propelled dry cargo and tanker ships. Tow or tug boats are not included. We present the information as a daily figure. It is important to note that this figure is an average, therefore depending on the season or day of the week the daily trips may be higher or lower.
- 5 Dowling and Associates, Inc. (2001). Truck Route/Weight Limitations Survey for West Contra Costa County. December 2001. Oakland, CA: Dowling Associates, Inc.
- 6 California Air Resources Board. (2007). Health Risk Assessment for the BNSF Railway Richmond Rail Yard. Sacramento, CA: California Air Resources Board.
- 7 This figure may not include Union Pacific trains originating at the Port of Oakland that use miles of West County rail infrastructure to transport cargo from Port of Oakland to destinations across the state and country. These UP trains travel through West County without stopping at the BNSF Richmond rail yard.
- 8 The original source presents information as a yearly figure of 10,752 recorded locomotives arriving, departing, or passing through the rail yard during the course of a year. We present the information as a daily figure. It is important to note that this figure is an average, therefore depending on the season or day of the week the daily trips may be higher or lower.
- 9 Dowling and Associates, Inc. (2001). Truck Route/Weight Limitations Survey for West Contra Costa County. December 2001. Oakland, CA: Dowling Associates, Inc.
- 10 The original source determined the number of trucks that travel on local streets by surveying all West County truck generator businesses and obtaining the total daily truck trips generated and the routes they used to access the facility. Figures include the number of trips on each road, not necessarily each truck, therefore one truck may be counted more than once as they travel from distribution center to the freeway. Truck generator businesses are defined as businesses where truck activity occurs, e.g. wholesale operations, manufacturing business, and petrochemical companies. Only heavy-duty trucks with five axels or more and that weight over three tons when loaded are included.
- 11 Pacific Institute. (2005). Deluged by Diesel: Healthy Solutions for West County. Oakland, CA. Retrieved November 2008 from [http://www.pacinst.org/reports/west\\_county\\_diesel](http://www.pacinst.org/reports/west_county_diesel).
- 12 Ibid (Same as above)
- 13 California Air Resources Board. (2005). Air Quality and Land Use Handbook: A Community Health Perspective. Retrieved November 2008 from <http://www.arb.ca.gov/ch/landuse.htm>.
- 14 Stansfeld, S.A., B. Berglund, C. Clark, I. Lopez-Barrio, P. Fischer, E. Ohrstrom, M. Haines, J. Head, S. Hygge, I. van Kamp, and B. Berry. (2005). Aircraft and road traffic noise and children's cognition and health: a crossnational study. *The Lancet*, 365:1942-1949.
- 15 Lercher, P., G. Evans, M. Meis, and W. Kofler. (2002). Ambient neighbourhood noise and children's mental health. *Occupational and Environmental Medicine*, 59, 6:380-6.
- 16 Port of Oakland. (2007). TCIF funding nomination for the Martinez Subdivision and Rail Improvements. Retrieved on October 10, 2008 from [www.portfoakland.com/pdf/tcif\\_02.pdf](http://www.portfoakland.com/pdf/tcif_02.pdf)
- 17 California Air Resources Board. (2005). Air Quality and Land Use Handbook: A Community Health Perspective. Retrieved November 2008 from <http://www.arb.ca.gov/ch/landuse.htm>.
- 18 Here we use the definition of "truck generator" used in the 2001 Dowling and Associates report, and use the buffer zone of 500 feet recommended by CARB for distribution centers.
- 19 CARB does not make a clear recommendation for the safe distance from a rail track, but they suggest that for tracks "within one mile of a rail yard, consider possible siting limitations and mitigation approaches (CARB, 2005)." This suggests that there is significant health risk near tracks within a mile of a rail yard, which confirms the experience of many West County residents. Therefore, this study included the population living within 500 feet of rail tracks less than a mile from a rail yard. (This distance however, does not even reach to Parchester Village, where residents report locomotives idling for as much as eight hours at a time.)

