UNIVERSITY OF CALIFORNIA, SANTA CRUZ

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December 2, 2005

Comments on the Draft Environmental Impact Report of 2005:

The members of the UC Santa Cruz Academic Senate Committee on Planning and Budget (CPB) offer these comments on the Environmental Impact Report (EIR) prepared for the 2005 Long Range Development Plan (LRDP) of the University of California, Santa Cruz (UCSC). They are responsive to the framework of the California Environmental Quality Act (CEQA). The contact person for further consultation is Professor Paul Koch, CPB chair and member of the Department of Earth Sciences, UCSC.

1. HOUSING

1.1. Housing on campus

The housing analysis assumes that 3,390 additional student beds and 125 new employee housing units will be built. The 84 employee housing units already approved but not built are ignored in the analysis. However, the EIR makes no commitment to actually building the student beds or employee housing units.[1] For instance; page 4.11-15 only states that "Based on the land designated for housing, approximately 3390 additional student beds could be built."

[1] In fact, it is a reasonable possibility that the university will be unable to build affordable housing either for its students or employees. The undergraduate student rent for a small triple room (excluding meal plan costs) is approximately $1870 per month per three students. With prevailing construction costs and projected trends, these rents will increase if more student housing is built. For comparison, the median rent of a house (shared by three students) in Santa Cruz is $1176-$1425, and the median affordability level for students is $1426-$1675 per household, according to the university consultants' report. Moreover, the difficulties the campus has faced in providing affordable employee housing are well known, as seen in UCSC Senate Resolution AS/SCP/1462 and from its recent history of trying to construct the 84 approved units of housing in Ranch View Terrace.

The impact on the housing market outside the university, Impact POP-3, is already found by the EIR to be "significant", and this impact would obviously be worse if the on-campus housing were not to be built. Therefore the on-campus housing should be treated as a mitigation measure, even though it is currently not listed as such.

CEQA guideline §15126.4(a) (2) states that "Mitigation measures must be fully enforceable through permit conditions, agreements, or other legally binding instruments. In the case of a plan, policy, regulation or other public project, mitigation measures can be incorporated into the plan, policy, regulation or project design." Accordingly, we ask that the EIR make definite commitments to building a specified amount of employee and student housing. It should specify not just the endpoint in 2020, but also how this housing will be phased in as the growth takes place. Since city and county housing projections are uncertain, these commitments could be accompanied by criteria to decide when they could be suspended because of overabundant off-campus housing.[2]

1.2 Impact on off-campus housing market

The analysis by the university's consultants,[3] which forms the basis for the calculations in the Housing section of the EIR, assumes that rents and for-sale prices in the city and county will be unchanged from their 2005 values. More precisely, it assumes that the distribution of rents and sale prices will stay constant relative to affordability levels for students and employees. This is a highly unrealistic assumption, and significantly underestimates the impact on the housing market of growth under the 2005 LRDP. For instance, in Table 4.11-12, the EIR projects that 1,146 extra housing units will be needed by university students and employees in Santa Cruz city under the 2005 LRDP, 1,220 will be needed by non-university personnel based on population growth, but only 1,684 housing units will be built. Even ignoring the additional housing demand based on regional employment growth, this will inevitably lead to an increase in housing prices. We ask that the impact on the housing market be estimated including price escalation because of population growth. One simple and reasonable way to do this is to consider the total population growth from university and non-university sources and assume that the housing stock will be taken by those in the highest affordability categories until all the housing stock is exhausted. This is based on the assumption that, faced with a shortage of housing, higher income households will drive up prices to the level they can afford in order to outbid lower income households.[4] Although the total number of people unable to afford housing in the county will not be affected by this change, they will all be in the lowest affordability categories. This changes the nature of the impact.

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[2] Low occupancy of on-campus housing cannot suffice as a criterion, since this could occur because the housing is overpriced instead of because of a genuine lack of demand. (See previous footnote.)

[3] Bay Area Economics (BAE) 2005 LRDP Housing Impact Analysis. Memorandum prepared for UC Santa Cruz.

[4] This analysis neglects the fact that some households will prefer to move out of the county instead of bidding higher for housing, On the other hand, it also neglects the impact of the much higher growth in employment in the county, which will inevitably contribute to housing demand (and therefore prices).

1.3. Minor errors in arithmetic in BAE 2005

There are apparent minor errors in arithmetic in the consultants' report that is the basis for the housing analysis in the EIR. In Appendix C-2, the third table estimates residual demand after the ownership market in the city of Santa Cruz. With the last assumption in Appendix A: Faculty and Staff Housing Demand, the expressed demand should be the lesser of the number of new housing units and new employees. This is not always the case in the table. Similar errors exist in other sections of Appendix C, and should be corrected.

1.4. Weakness of Scenario 2 in the housing analysis

The housing analysis is performed using two scenarios. The first assumes that all employees hired by the university will look for housing. The second assumes that 69% of the employees will already be living in the county when they are hired, based on past hiring data. This is less reasonable than it seems. As explained in the consultants' report on which this section is based, even if an employee is hired from within the county, their joining the university opens up a vacancy (unless they were unemployed) that has to be filled by someone from outside the county (or will have to be after several iterations of this process). This weakness of Scenario 2 should be mentioned in the EIR instead of being relegated to the consultants' report. Otherwise, this scenario creates a misleadingly optimistic impression about the impact on housing.

2. TRAFFIC

2.1. AMBAG model used incorrectly

The core of the traffic analysis for growth under the 2005 LRDP consists of two parts: a traffic model to predict the amount of traffic on various roads and at various intersections, and a level of service (LOS) calculation at the intersections. We consider these issues in sequence.

The traffic model used is the latest Association of Monterey Bay Area Governments (AMBAG) model, released in late 2004. Although AMBAG has a history of developing traffic models, there are no data to assess the validity of the latest version of the model, or to ascertain that the university has run the model correctly. Therefore, we have used various consistency checks to verify the results obtained from the model.

Figures 4.14-9 and 4.14-10 show the traffic counts at various intersections during the AM and PM peak hours. For each intersection, the total number of vehicles during the peak hours in each of the twelve traffic streams (coming from all four directions and turning left, right, or going straight) is shown. From Figure 4.14-9-1, one can see that the model predicts that 701 vehicles come towards intersection 1 from intersection 10 during the PM peak hour. However, from Figure 4.14-9-10, one can see that the model predicts 357 vehicles going from intersection 10 towards intersection 1. There is only a bus stop in the short distance between these intersections, which cannot explain the huge discrepancy

between these numbers.[5] Similar inconsistencies are also seen at some other pairs of intersections.

Such large discrepancies make the subsequent conclusions based on these projections suspect. Furthermore, with such errors, it is impossible to run more subtle checks on the internal consistency of the traffic projections. This limits the ability for meaningful public review and comment. We ask that this section of the EIR be withdrawn, corrected, and recirculated, under provisions of CEQA guideline §15088.5(4).

2.2. Inaccurate LOS calculations

We now turn to the second core element of the traffic analysis in the EIR and demonstrate that it, too, has serious flaws. LOS calculations are given in Appendix E of the EIR. Because of the difficulty in understanding the notation in the appendix (which will be discussed further in the next comment), we concentrate on the calculations for PM peak hour traffic at Intersection 19, King-Union with Mission Street-SR1, with and without the project.

If we first consider southbound traffic (coming off King Street to Mission Street) with the project, the analysis proceeds in several stages. In the first stage, the saturated flow in both lanes is calculated as per the Highway Capacity Manual. Starting from a reference value of 1,900 vehicles/hour, various adjustments for lane utilization and turning vehicles are made, yielding a saturated flow of 1,681 and 1,683 vehicles/hour in the two lanes. This is the estimate for the maximum number of vehicles that could flow in the two lanes if the traffic light had been permanently green. Since the green light stays on for 29% of the time during an actuated cycle of traffic lights, the lane capacities are reduced to 490 and 491. The calculation then takes the total projected southbound traffic at this intersection, divides it between the two lanes, and estimates that 661 and 604 vehicles would arrive in the two lanes during the PM peak hour. This yields a flow/capacity of 1.35 and 1.23 respectively.

Clearly, with traffic arriving at a rate higher than the capacity of the lanes, serious delays are expected. Yet, the LOS calculation predicts a delay of 223.5 and 173.8 seconds for the two lanes. Although this is a level of service F, the delay is less than one would expect. We believe that this is because the LOS calculation incorrectly uses Equation 16-12 from the Highway Capacity Manual to calculate the incremental delay d_2 (in addition to the uniform control delay d_1), with T = 0.25 hours (the standard unit for highway traffic analysis), k = 0.5 (appropriate for saturated flow, as shown in Exhibit 16-13 of the Manual), and I = 1.0 in accordance with the discussion on page 16-22 of the manual. Substituting these values in Equation 16-12, we obtain the following numbers for d_2 in the various lanes:

[5] By contrast, the corresponding numbers for the 2003-04 traffic counts are 701 and 719. The difference is small.

Lane	c(veh/hr)	X	d_2(Appendix E)	d_2(Equation 16-12)
1	1420	1.34	159.8	157.8
2	38	0.92	114.3	123.2
3	1789	1.10	54.2	54.2
4	193	0.06	0.6	0.6
5	490	1.35	170.1	170.6
6	491	1.23	120.4	120.4

Apart from lane 2, there is very good agreement between d_2 reported in Appendix E and d_2 calculated from Equation 16-12 with the parameters chosen above, confirming that this is how the analysis was done. (The last two lanes are the southbound traffic.)

Shorn of the algebra, the analysis amounts to the following: assume that there is no traffic backed up at the traffic light when the analysis starts. For the next fifteen minutes, the traffic arriving at the intersection is greater than its maximum capacity, leading to steadily increasing backups. However, since the analysis time period is only 15 minutes, the average backup (and hence the d_2 delay) is only a few minutes. Obviously, this calculation severely underestimates the impact of the growth: if the time period for which the analysis is performed were increased, delays would get progressively worse. This would continue until such time as the vehicles start to arrive at a rate less than the lane capacity and the backup can be cleared. For instance, if the congestion lasts for an hour,[6] the d_2 delay at the end of this interval in lane 5 would be more than 20 minutes. This is easily understood: with a 35% load in excess of capacity, at the end of an hour, ignoring fluctuations in input traffic (which would make matters worse), there would be a delay of 0.35 X 60 minutes = 21 minutes. (Even for a fifteen minute interval, with the maximum delay for $X > 1$ occurs at the end of the interval, whereas the EIR reports the average delay.)

Not only does the LOS calculation violate common sense; it is also contrary to the Highway Capacity Manual's instructions. Page 16-23 states that if $v/c=X$ is greater than 1, this "is an indication of actual or potential breakdown. In such cases, multi-period analyses are advised." Page 16-4 also says, "If v/c exceeds 1.0 during the analysis period, the length of the analysis period should be extended to cover the period of over saturation in the same fashion, as long as the average flow during that period is relatively constant. If the resulting analysis period is longer than 15 min. and different flow rates can be identified during equal-length sub-periods within the longer analysis period, a multiple-period analysis using the procedures in Appendix F should be performed."

We ask that the traffic section of the EIR be withdrawn, corrected, and recirculated, in accordance with CEQA Guideline §15088.5(2). All intersections which are oversaturated should be reanalyzed, consistent with the Highway Capacity Manual and Comment 2.6 in this document. In addition, the d_3 delay of the Highway Capacity Manual should be included for all oversaturated and near saturation intersections, since traffic builds up

[6] The peak hour factor is 0.98, i.e., the average traffic flow rate during the peak hour is only 2% less than during the 15 minute period analyzed, so this is a conservative assumption.

gradually to peak hour and a substantial backlog is expected even at the beginning of the hour.

2.3. Inadequate information in the EIR

CEQA guideline §15140 states that "EIRs shall be written in plain language so that decision-makers and the public can rapidly understand the documents." The traffic section of the EIR lacks important details that make it impossible to properly check the correctness of the analysis performed. Most notably, the LOS calculations in Appendix E have no explanation for the symbols used. As university faculty in disciplines that include the natural sciences and engineering, if we are unable to decipher the analysis (except for intersection 19, discussed earlier), we believe that it is not accessible to the general public. In order to allow the public to fulfill its role as envisioned in CEQA,[7] we ask that when the traffic section of the EIR is recirculated, it should provide the following extra information:

> i) LOS calculations in Appendix E should use standard symbols and nomenclature and provide a key that cites appropriate pages and equations of the Highway Capacity Manual for the terms in each line of the calculation. If the pages in Appendix E are in more than one format, as they are at present, such a key should be provided for each format.
> ii) All the assumptions and input parameters that were chosen when running the AMBAG model should be specified. For instance, although 2020 Without LRDP assumes no change in the campus population, does it assume any change in the buildings, and if so where? The distribution of where university employees and students live in the 2020 With LRDP scenario is also an input to the model, and should be specified.[8]

2.4. Financial estimates and guarantees

In TRA-3B, the EIR proposes building several new parking lots as needed, with up to 5,600 new parking spaces. Of these, up to 2,500 spaces would replace parking lost to infill. There is good reason to expect that this will be impossible, because all costs for construction of parking spaces are paid by parking permit fees, and such extensive construction could make permits unaffordable.[9]

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[7] "An agency's opinion concerning matters within its expertise is of obvious value, but the public and decision-makers, for whom the EIR is prepared, should also have before them the basis for that opinion so as to enable them to make an independent, reasoned judgment." *(Santiago County Water Dist. v. County of Orange (1981) 118 Cal.App.3d 818, 173 Cal. Rptr, 602.)*

[8] The distribution of population and employment is hand coded into the land use file used in the regional travel demand model. (Todd Muck, AMBAG Senior Planner Transportation, personal communication.) We assume that this was done by the university for the extra population (students and employees) associated with the 2005 LRDP.

[9] At present, all costs for the construction of parking spaces (including the cost of replacing spaces lost to infill) are paid for from parking permits. The number of commuter parking spaces in 2003-04 is approximately 3500. We estimate conservatively that the campus will have to build 1500 new parking spaces to accommodate the increase in student population by nearly 50% and of employee population by approximately 30%, and that an additional 1000 spaces will be needed to compensate for infill. Most recently, the campus is preparing plans to increase the number of spaces in the East Remote parking lot by 500, at a cost of $15 million. For 2400 spaces, this extrapolates to a cost of

Two factors will aggravate this problem. First, the campus transit network will have to expand by an amount disproportionate to the population increase, because it will also have to cover a wider geographical area. The cost of this is borne by parking and student fees. Second, the EIR proposes various transportation demand measures (TDM) in mitigation TRA-2B if campus growth causes unacceptable levels of service at off-campus intersections (which the EIR predicts will occur), and signalization of two on-campus intersections in TRA-1. Many TDM measures are implemented by the university at present with financial incentives, paid for by parking fees. Signalization, to the extent not paid by external grants, has also been paid by parking fees.

As discussed in comment 1.1, CEQA guideline §15126.4(a) (2) requires that mitigation measures should be fully enforceable and legally binding. In order for TRA-3B to qualify as a mitigation measure, we ask that the EIR provide criteria to determine the need for TRA-3B (for instance the impact of university vehicles on neighborhood parking) and that the university undertake to implement this measure when these criteria are met. Similar specificity is needed for TRA-2B: at present, none of the measures in Table 4.14-19 has to be implemented, and no target has to be met by TRA-2B.

The remaining comments point out places in the EIR where the magnitude of various impacts of growth is not adequately characterized. The basic purpose of CEQA is to "inform governmental decision-makers and the public about the potential, significant environmental effects of proposed activities" (CEQA guideline §15002(a) (1), also guideline §15121(a)). Clearly, this information should represent the environmental effects adequately, which is why we believe these comments are appropriate.

2.5. Pedestrian crossings on campus

Table 4.14-3 presents data on the LOS at various key pedestrian crossings on campus. As far as we can ascertain, this LOS refers to pedestrians. The text below the table also says that vehicular delays were less than 60 seconds at most intersections, except at College Eight/Porter where the delay was an average of a minute and a half.

We consider this discussion to be inadequate for the following reasons: (a) No analysis is presented for the expected delay for vehicles and the LOS for pedestrians in 2020. Only present conditions are given. In view of the fact that delays at College Eight/Porter are already 1.5 minutes, and the LRDP proposes increasing campus population by approximately a factor of 1.5, this is a serious concern. Without traffic lights, and with the consequent nearly continuous stream of pedestrians, the vehicular delays at these

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$72 million (assuming that construction costs stay constant in today's dollars through the duration of the 2005 LRDP). With a 5% interest loan, compounded monthly, paid over 30 years, this requires an annual payment of $8.65 million.

In 2003-04, the annual parking budget was approximately $3.5 million, with $1 million deposited in a parking reserve. Thus with the construction projects in the 2005 LRDP, without saving money for parking reserves, the annual parking budget would be approximately $8.65 + $2.5 = $11.15 million, i.e., an increase by more than a factor of 3. With a 40% to 50% increase in the number of permit holders, average annual parking fees would more than double, even though most close-in parking lots would be lost and people would have to park further from the campus core.

crossings could rise dramatically.[10] We note that even a delay of 60 seconds is an F LOS for vehicles at an unsignalized intersection. (b) Table 4.14-3 does not state whether the data presented is a peak hour analysis, even though the text on the preceding page states that data were collected from 9AM to 5PM.

In view of the variability of vehicular traffic, and the strong variability of pedestrian traffic associated with the change of classes, a peak 15 minute analysis using Method A of the Highway Capacity Manual page 16-8 (modified appropriately for unsignalized pedestrian crossings) should be done. A similar analysis should be performed with projections for 2020 with and without the project.[11]

2.6. Fluctuations in traffic

The EIR projects unacceptable levels of service at 11 off-campus intersections with the 2005 LRDP. This is based on an analysis that takes the projected average traffic during AM and PM peak hours in 2020. As is well known, and verifiable from the May 2004 traffic counts reported in Appendix E, traffic is highly variable. In order to estimate the impact of the 2005 LRDP on critically affected intersections, we ask that the EIR estimate the LOS at these 11 intersections, or at a minimum at the King-Union/Mission and Bay/Mission intersections, with a) typical fluctuations from one 15 minute interval to another included. These could be based on the 2003-04 measurements. Thereafter, Method C of the Highway Capacity Manual page 16-8 should be used. b) the assumption that the total traffic during peak hour is slightly higher than the average measured over several days. This excess traffic can be estimated from the day to day variations in the 2003-04 counts, and measuring the typical excess traffic on a busier than average day.[12] If such measurements are not available, fluctuations in the counts at the campus Main Entrance can be used to estimate traffic variability. This comment should be considered in conjunction with Comment 2.2.

2.7. Impact of mitigation measures

Table 4.14-18 lists various potential improvements that could improve traffic conditions. Some of these are crucial, such as at Intersection 8 (Empire Grade Road/Western Drive) and Intersection 9 (Empire Grade Road/Heller Drive). We ask that the EIR verify and confirm that making these improvements would not degrade the LOS at other intersections, either by restricting flow at upstream intersections or providing an increased volume at downstream intersections. CEQA guideline §15126.4(a)(1)(D)

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[10] These intersections already operate at near capacity during peak load. In such a situation, it is well known in traffic analysis that small increases in load can substantially increase delays. For vehicles, the situation is worse because they have lower priority at the intersections than pedestrians.

[11] Page 4.14-30 suggests that pedestrian conflicts under the 2005 LRDP on McLaughlin Drive could be reduced through a combination of traffic calming, pedestrian safety improvements and, potentially, grade separated pedestrian crossings. This is speculative and not sufficiently defined to count as a mitigation as per CEQA guideline §15126.4(a)(2). Therefore we ignore this statement.

[12] For instance, one standard deviation above the mean peak hour traffic. This excess traffic would have to be prorated for 2020.

requires that if a mitigation causes significant effects in addition to those caused by the project, these effects should be discussed; by extension, this should also apply to an existing significant effect being worsened by the mitigation. While the EIR cannot consider all possible subsets of Table 4.14-18, we ask that it should perform this analysis if all the improvements at Intersections 8, 9, 19 and 23 are made.

2.8. End to end delays

The EIR estimates the LOS at various key intersections, and projects that at several of them, the LRDP will cause unacceptable delays for vehicular traffic. However, several other intersections with two way or four way stop signs (e.g. on Heller Drive or High Street) are not considered. In order to properly measure the impact of campus growth on traffic and inform the public about this, we ask that the EIR estimate the cumulative delay experienced by a vehicle traveling to the campus during AM peak hour and from the campus during PM peak hour when going from a) Baskin Engineering through the West Entrance, then down Bay Street through the Highway 1/River Street signal light b) College 9 through the Main Entrance, then down High Street to Mission Street and through the Highway 1/River Street signal light with and without the 2005 LRDP, neglecting all accidental delays in free flowing traffic between intersections.

SUMMARY OF REQUESTS:

(This summary is provided to help the reader. The full text of the comments, as given in the previous sections, should be responded to individually.)

1.1: Acknowledge that on-campus housing is a mitigation for growth, and provide commitments to build a specified amount of housing, with information on how housing will be phased relative to growth, and with criteria to indicate when on-campus housing construction would be suspended because of surplus housing in the off-campus market.

1.2: Estimate how growth under the LRDP would impact housing prices.

1.3: Fix errors in arithmetic in the housing analysis.

1.4: Include the counterargument to Scenario 2 in the housing analysis, which is provided in the university consultants' report, in the text of the EIR.

2: Problems with the AMBAG model and LOS calculations raise such serious concerns about Section 4 of the EIR that we do not consider it a reliable analysis of traffic impacts due to growth. We request that the traffic section be withdrawn, that the issues listed below be addressed, and that the revised traffic section be resubmitted for public comment.

2.1: Rerun the AMBAG model to resolve the large discrepancies for traffic flow to and from pairs of intersections.

2.2: Redo the LOS calculations for all intersections that are oversaturated in a manner consistent with the Highway Capacity Manual and Comment 2.6 in this document.

2.3: Use standard symbols and nomenclature in Appendix E or supply a key, and clearly state all assumptions and input parameters used in the AMBAG model.

2.4: Provide criteria to determine when mitigation measures TRA-2B and TRA-3B will be implemented and commit to implementation if these criteria are met.

2.5: Redo the LOS calculations for pedestrian traffic to include current 15-minute peak traffic and projected traffic in 2020 with and without growth projected under the 2005 LRDP.

2.6: Provide LOS estimates at key, impacted intersections that consider reasonable levels of variability in traffic flow.

2.7: Evaluate the impacts of essential mitigation projects on LOS at other intersections.

2.8: Estimate the cumulative delay experienced by a vehicle traveling to the campus during AM peak hour and from the campus during PM peak hour along two routes.

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